No.EX※※-OML0011-B

Operation Manual

PRODUCT NAME

Fieldbus Device
Handheld Terminal

MODEL / Series / Product Number

EX600-HT1A

SMC Corporation

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Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution", "Warning" or "Danger". They are all important notes for safety and must be followed in addition to International standards (ISO/IEC) *1) and other safety regulations.

*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.
ISO 4413: Hydraulic fluid power -- General rules relating to systems.
IEC 60204-1: Safety of machinery -- Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1992: Manipulating industrial robots -Safety.
etc.

⚠Caution : CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠Warning : WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠Danger : DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ Caution

The product is provided for use in manufacturing industries.
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. *2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

*2) Vacuum pads are excluded from this 1 year warranty.
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Operator

- ♦This operation manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenance of such equipment. Only those persons are allowed to perform assembly, operation and maintenance.
- ♦Read and understand this operation manual carefully before assembling, operating or providing maintenance to the product.

■Safety Instructions

⚠Warning
■Do not disassemble, modify (including changing the printed circuit board) or repair. An injury or failure can result.
■Do not operate or set with wet hands. This may lead to an electric shock.
■Do not operate the product outside of the specifications. Do not use for flammable or harmful fluids. Fire, malfunction, or damage to the product can result. Verify the specifications before use.
■Do not operate in an atmosphere containing flammable or explosive gases. Fire or an explosion can result. This product is not designed to be explosion proof.
■Do not press the display. This may cause injury and damage to the LCD display.
■If using the product in an interlocking circuit: •Provide a double interlocking system, for example a mechanical system. •Check the product regularly for proper operation. Otherwise malfunction can result, causing an accident.
■The following instructions must be followed during maintenance: •Turn off the power supply. •Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance. Otherwise an injury can result.
■The forced input/output function is used to change the signal status forcibly. When operating this function, be sure to check the safety of the surrounding and installation. Otherwise, injury or equipment damage could result.
■Incorrect setting of parameters can cause malfunction. Be sure to check the settings before use. Otherwise, injury or equipment damage could result.

⚠Caution

■After maintenance is complete, perform appropriate functional inspections.
Stop operation if the equipment does not function properly.
Safety cannot be assured in the case of unexpected malfunction.

■Changing select Hold/Clear function mode switches the operation of I/O signals in an emergency. Carry out settings paying attention to safety.
Otherwise, injury or equipment damage could result.

■NOTE

○Follow the instructions given below when designing, selecting and handling the product.

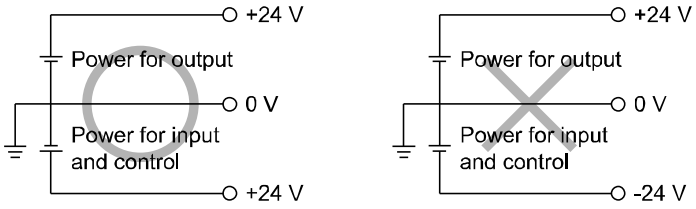
●The instructions on design and selection (installation, wiring, environment, adjustment, operation, maintenance, etc.) described below must also be followed.

∗Product specifications

•The direct current power supply to combine should be UL 1310 Class2 power supply when conformity to UL is necessary.

•Use the specified voltage.
Otherwise failure or malfunction can result.

•The power supply for the unit should be 0V as the standard for both the power supply for outputs and the power supply for inputs and control.



•Do not remove any nameplates or labels.
This can lead to incorrect maintenance, or misreading of the operation manual, which could cause damage or malfunction to the product.
It may also result in non-conformity to safety standards.

•Beware of inrush current when the power supply is turned on.
Some connected loads can apply an initial charge current which will activate the over current protection function, causing the unit to malfunction.

●Product handling

∗Installation

•Do not drop, hit or apply excessive shock to the SI unit.
Otherwise damage to the product can result, causing malfunction.

∗Wiring

•Avoid repeatedly bending or stretching the cables, or placing heavy load on them.
Repetitive bending stress or tensile stress can cause breakage of the cable.

•Wire correctly.
Incorrect wiring can break the product.

•Do not route wires and cables together with power or high voltage cables.
Otherwise the SI unit and/or input or output device can malfunction due to interference of noise and surge voltage from power and high voltage cables to the signal line.
Route the wires (piping) of the SI unit and/or input or output device separately from power or high voltage cables.

•Confirm proper insulation of wiring.
Poor insulation (interference from another circuit, poor insulation between terminals, etc.) can lead to excess voltage or current being applied to the product, causing damage.

•Take appropriate measures against noise, such as using a noise filter, when the Fieldbus system is incorporated into equipment.
Otherwise noise can cause malfunction.

∗Environment

•Do not use the product in area that is exposed to corrosive gases, chemicals, sea water, water or steam.
Otherwise failure or malfunction can result.

•Do not use in an area where surges are generated.
If there is equipment generating large surge near the unit (magnetic type lifter, high frequency inductive furnace, welding machine, motor, etc.), this can cause deterioration of the internal circuitry element of the unit or result in damage. Take measures against the surge sources, and prevent the lines from coming into close contact.

•The product is CE marked, but not immune to lightning strikes. Take measures against lightning strikes in the system.

•Prevent foreign matter such as dust or wire debris from getting inside the product.

•Mount the product in a place that is not exposed to vibration or impact.
Otherwise failure or malfunction can result.

•Do not use the product in an environment that is exposed to temperature cycle.
Heat cycles other than ordinary changes in temperature can adversely affect the inside of the product.

•Do not expose the product to direct sunlight.
If using in a location directly exposed to sunlight, shade the product from the sunlight.
Otherwise failure or malfunction can result.

•Keep within the specified ambient temperature range.
Otherwise malfunction can result.

•Do not operate close to a heat source, or in a location exposed to radiant heat.
Otherwise malfunction can result.

∗Adjustment and Operation

•Perform settings suitable for the operating conditions.

Incorrect setting can cause operation failure.

•Please refer to the PLC manufacturer's manual etc. for details of programming and addresses.

For the PLC protocol and programming refer to the relevant manufacturer's documentation.

∗Maintenance

•Turn off the power supply, stop the supplied air, exhaust the residual pressure and verify the release of air before performing maintenance.

There is a risk of unexpected malfunction.

•Perform regular maintenance and inspections.

There is a risk of unexpected malfunction.

•After maintenance is complete, perform appropriate functional inspections.

Stop operation if the equipment does not function properly.

Otherwise safety is not assured due to an unexpected malfunction or incorrect operation.

•Do not use solvents such as benzene, thinner etc. to clean each unit.

They could damage the surface of the body and erase the markings on the body.

Use a soft cloth to remove stains.

For heavy stains, use a cloth soaked with diluted neutral detergent and fully squeezed, then wipe up the stains again with a dry cloth.

Model Indication and How to Order

EX600–HT1A–□

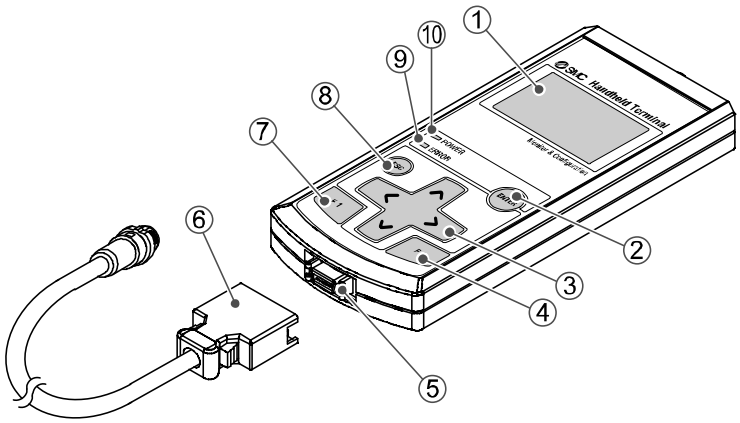
Length of Cable for Handheld Terminal

Symbol	Content
Nil	Without cable
1	1 m
3	3 m

Option

Name	Product number
Handheld Terminal cable 1m	EX600-AC010-1
Handheld Terminal cable 3m	EX600-AC030-1

Names and Functions of Product



No.	Description	Function
1	LCD display	Displays operation items and information about the unit.
2	ENTER button (ENTER)	In the selecting screen, this button shifts the screen to the item that has been selected. In the setting screen, it registers what has been set on that screen so far.
3	Cursor direction buttons (↑, ↓, ←, →)	Moves the cursor of the LCD display up, down, left and right. In the selection screen, move the cursor up, down, left and right to select the item. In the setting screen, increase/decrease or turn ON/OFF the set value.
4	F2 button (F2)	Functions according to the display or instructions on the screen.
5	Connecter	Connects the Cable for Handheld Terminal.
6	Cable for Handheld Terminal	Connects the SI unit and Handheld Terminal.
7	F1 button (F1)	Functions according to the display or instructions on the screen.
8	Escape button (ESC)	In the selection screen, this button will return the screen to the previous page. In the setting screen, it cancels what has been set so far on that screen, and returns the screen to the previous page.
9	ERROR display LED	The LED turns ON when a diagnostic error occurs. *
10	POWER display LED	The LED turns ON when the EX600 SI unit is connected and the power is supplied.

*: Refer to Troubleshooting (page 50) for the further details of countermeasures.

■Definition and terminology

	Terminology	Definition
C	Channel number	Sequential number given to each input and output on an individual module (Refer to the manual of each unit for the arrangement of the channels). Number given for each unit's input and output point. Please refer to the manual of each unit for the arrangement of the channel.
D	Diagnostic	Function of EX600 to self monitor if error has occurred or configuration has changed.
E	Error log	A chronological list of previous errors occurred. A maximum of 30 errors can be recorded.
	Enforced output function	A function to drive an output signal forcibly, ignoring control data from the PLC.
	Enforced input function	A function to specify an input signal forcibly, ignoring signal from the connected sensor.
H	Handheld Terminal (H.T.)	Connected to the dedicated connector of the SI unit to adjust the internal parameters, monitor the status of all input and output signals, and turn on input and output forcedly.
M	Manifold number	The number of the EX600 manifold that includes the selected unit. This function will be utilized in the future. Until then, the current state will always be 0.
O	ON/OFF counter	Counter of number of times when output or input changes from OFF to ON.
P	Parameter copy function	Function to copy selected unit parameter setting to all units in the manifold or also to copy channel parameter to all channels in the same unit.
	Power save	The LCD's backlight is turned off to save power.
S	SI unit	Abbreviation of serial interface unit. A unit connected to a PLC to communicate input and output data.
T	Tag	An electronic, 4 character name that can be given to units. This name can help with unit management. Electronic name can be given to manage units. Each unit can be given maximum of 4 digits of character.
U	Unit number	Selected unit's number. Unit connected right of the end plate becomes unit number 0.

Mounting and Installation

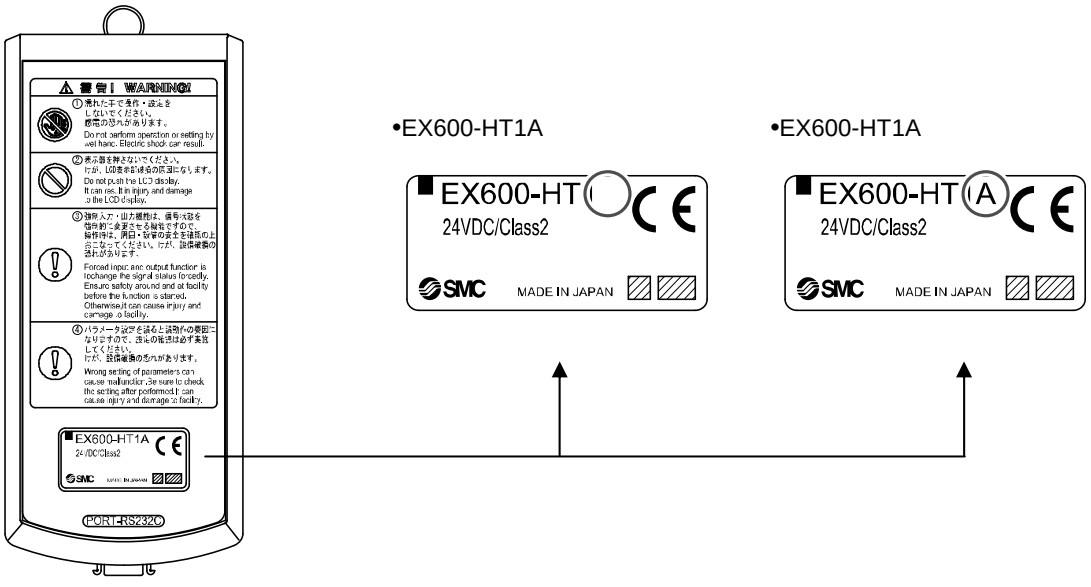
■Precautions before mounting

The units that can be connected vary depending on the Handheld Terminal product number.
Check the applicable unit type before mounting the unit.

Units that can be assembled			Product number of the Handheld Terminal	
			EX600-HT1	EX600-HT1A
Product nunber	SI unit	EX600-SPR□	○	○
		EX600-SPR□A	○	○
		EX600-SDN□	○	○
		EX600-SDN□A	○	○
		EX600-SMJ□	○	○
		EX600-SEN□	×	○
	Digital input unit	EX600-DX□B	○	○
		EX600-DX□C□	○	○
		EX600-DX□D	○	○
		EX600-DX□E	×	○
		EX600-DX□F	×	○
	Disital output unit	EX600-DY□B	○	○
		EX600-DY□E	×	○
		EX600-DY□E1	×	○
		EX600-DY□F	×	○
	Digital I/O unit	EX600-DM□E	×	○
		EX600-DM□F	×	○
	Analog input unit	EX600-AXA	○	○
	Analog output unit	EX600-AYA	×	○
	Analog I/O unit	EX600-AMB	×	○

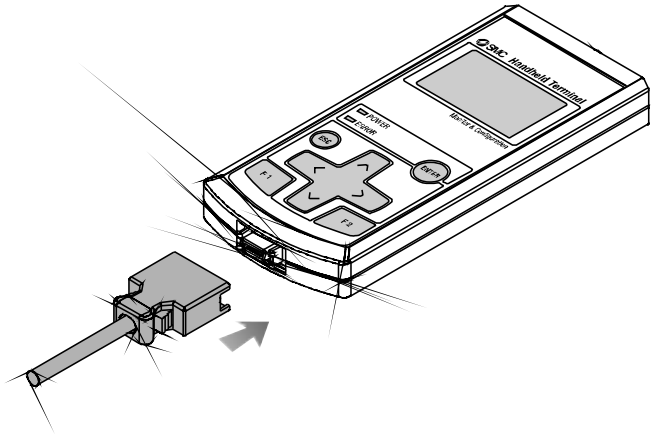
∗1: EX600-HT1 cannot recognize EX600-D□□E, EX600-D□□F, Ex600-AYA and EX600-AMB.

Find the product number of the Handheld Terminal referring to the label shown in the figure below.

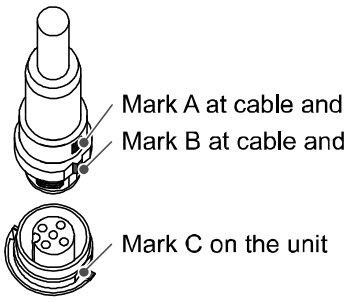
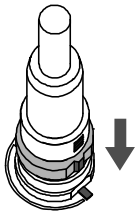
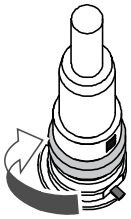


■Wiring

Insert the cable for Handheld Terminal into the connector, with the connectors aligned in the same direction.



•Connect the M12 connector on the Handheld Terminal cable into the connector (PCI) of the SI unit.
(1)Align the mark A on the metal bracket of the cable side connector (plug/socket) with the mark B.
(2)Align the mark C on the unit and insert the connector into the unit vertically.
If they are not aligned, the connector cannot be joined properly.
(3)When the mark B of the connector has been turned 180 degrees (1/2 turn), wiring is completed. Confirm that the connection is not loose. If turned too far, it will become hard to remove the connector.

(1)	(2)	(3)
		

●Precautions for handling

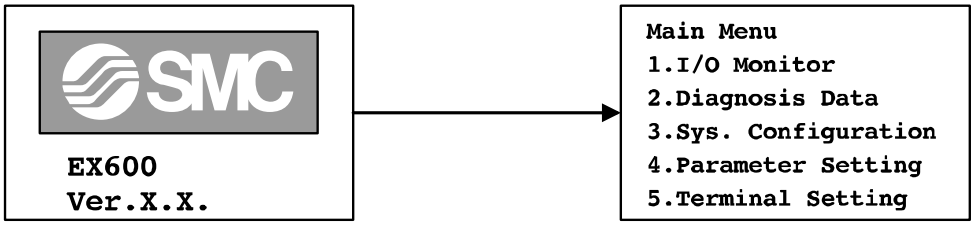
•If there is any foreign matter or water droplets stuck to or inside the SI unit or Handheld Terminal, clean and remove them before connecting the cable. If the SI unit is installed in an environment where residual liquid is accumulated, use a soft cloth to gently remove it.

Setting and Adjustment

■Basic operation

Supply of Power

(1)When the SI Unit is connected to the cable, the power is supplied to the Handheld Terminal.
(2)The POWER LED (green) turns ON, and the start-up screen is displayed on the LCD display.
(3)Then the screen shifts to the mode selection screen.
(4)The operation is explained on the following pages.



Mode selection screen

Power OFF

During Main Menu screen, remove the cable connected to the SI unit

Power Saving

When the ESC button is pressed for 2 seconds or longer while the power supply is ON, the display on the display on the LCD screen disappears. Press the ESC button to reset it.

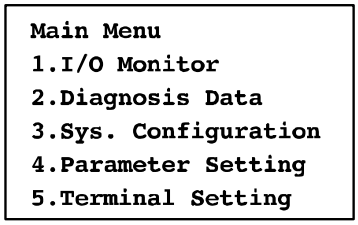
●Precautions for handling

•The connector should be removed only when the mode selection screen is displayed. Failure, accident and malfunction can result.

■Mode selection

Outline of modes

The Handheld Terminal has five modes.
Each mode further consists of detailed mode levels,
which can be used to set and check each type of data.

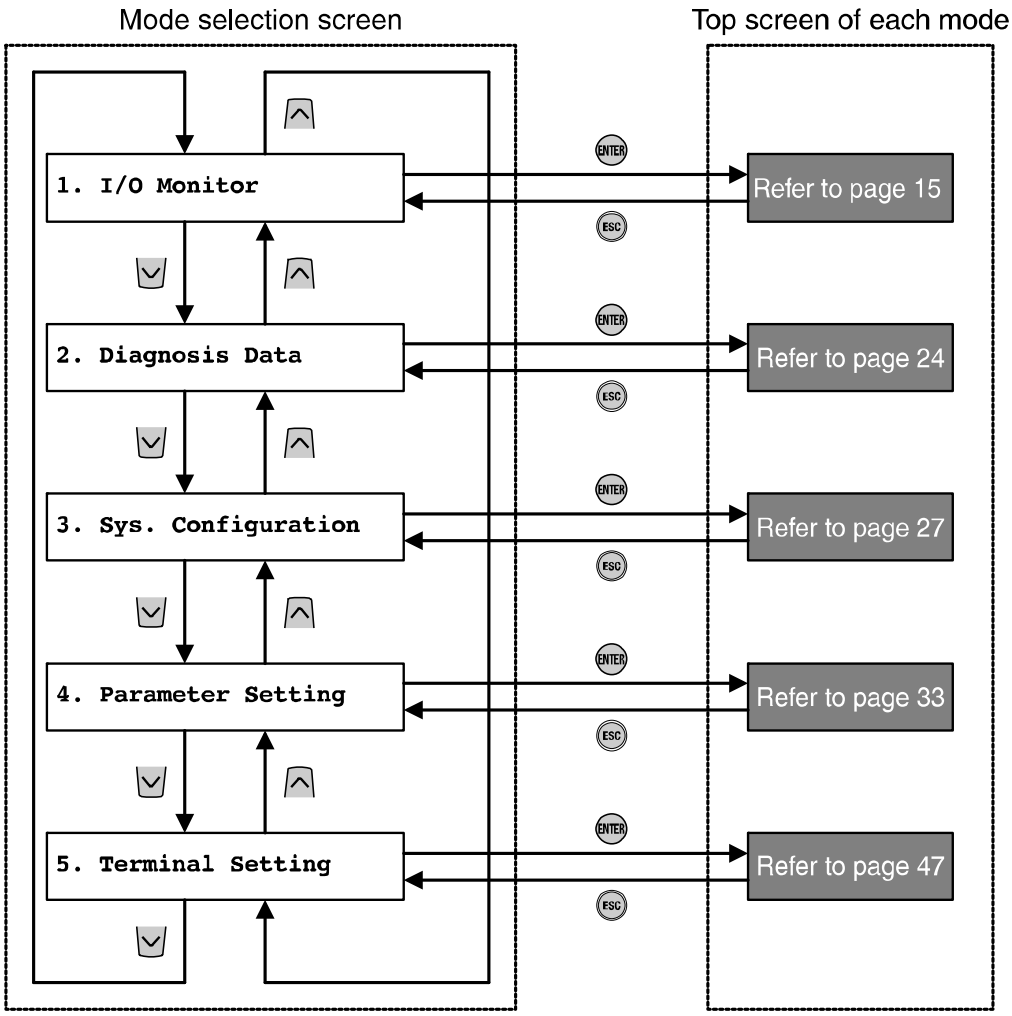


Mode selection screen

No.	Mode	Outline
1	I/O Monitor	Displays the unit input and output status and performs forced input and output. (Refer to page 15)
2	Diagnosis Data	Displays the input and output status of the unit, detailed error contents and error log. (Refer to page 24)
3	Sys. Configuration	Sets the sysytem operation as follows. (Refer to page 29) 1. Edits the tag name of each unit. 2. Update the unit structre memorry infomaion. 3. Select the Hold/Clear function to be set either by the SI unit switches, or by the Handheld Terminal. 4. Clears the ON/OFF counter valve of each unit. 5. Resets the parameters of each unit to the default values. 6. Clear all error logs.
4	Parameter Setting	Sets various parameters. (Refer to page 35)
5	Terminal Setting	Sets the operation of the Handheld Terminal as follows. (Refer to page 49) 1. Sets the contrast of the LCD display screen. 2. Sets the brightness of the LCD display screen. 3. Sets the volume of the click sound when buttons are pressed. 4. Sets the time before entering Power Save mode when no operation is performed. 5. Returns the settings 1 to 4 above to the default values. 6. Change the password.

Follow of mode selection

1. In the mode selection screen, move the cursor up and down by pressing the ^ or v button and select the next mode.
2. When the mode is selected and the ENTER button is pressed, the screen shifts to the top screen of each mode.
3. To return to the mode selection screen from the top screen of the each mode, press the ESC button.

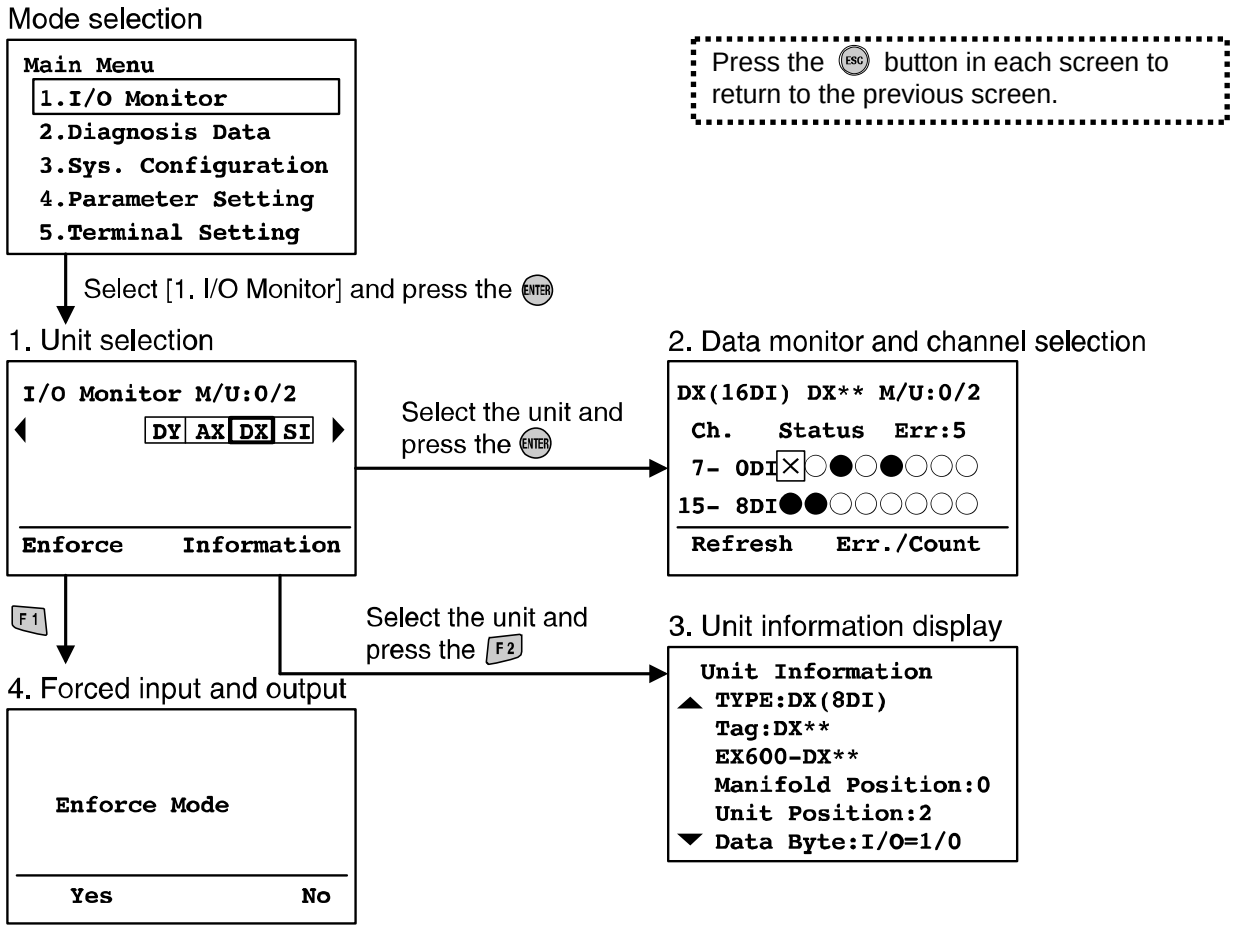


∗: When each button is pressed, the mode shifts in the direction indicated by the arrow.

■1. I/O monitor

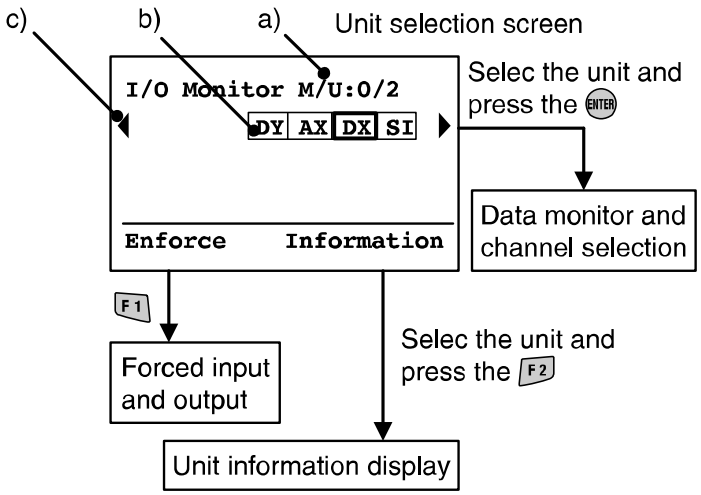
Mode levels

The I/O monitor mode is composed as shown in the diagram below.



Mode	Outline
1. Unit Selection	Select the unit to perform the operation from 2 to 4. (Refer to page 16)
2. Data monitor and channel selection	Input and output status of the unit, error information, and ON/OFF count values are displayed. (Refer to page 17)
3. Unit information display	The information of the unit selected is displayed. (Refer to page 19)
4. Forced input and output	The input and output signal of the unit is forcibly operated with the Handheld Terminal. (Refer to page 20)

1. Unit selection



♦Explanation of screen

a) Manifold number *1/Unit number *2
   Displays the manifold number and unit number of the unit selected.

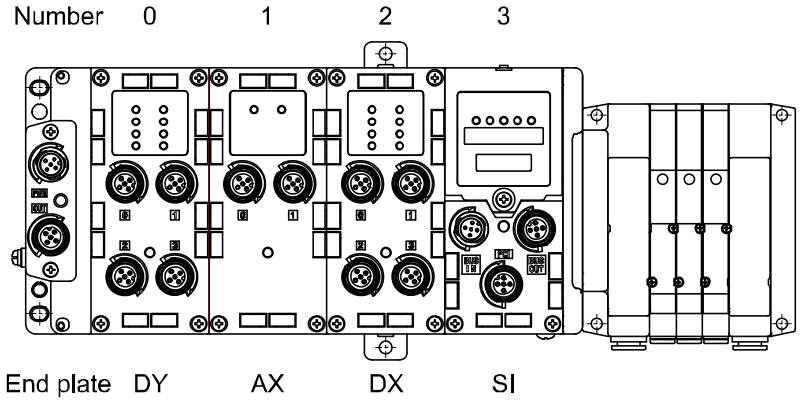
b) Unit symbol (Refer to page 54)
   Select the unit with the < and > buttons.

c) The next unit structure will be displayed by pressing the < or > buttons.

∗1: The manifold number is function which will be used for extension in the future, so “0” is always display.

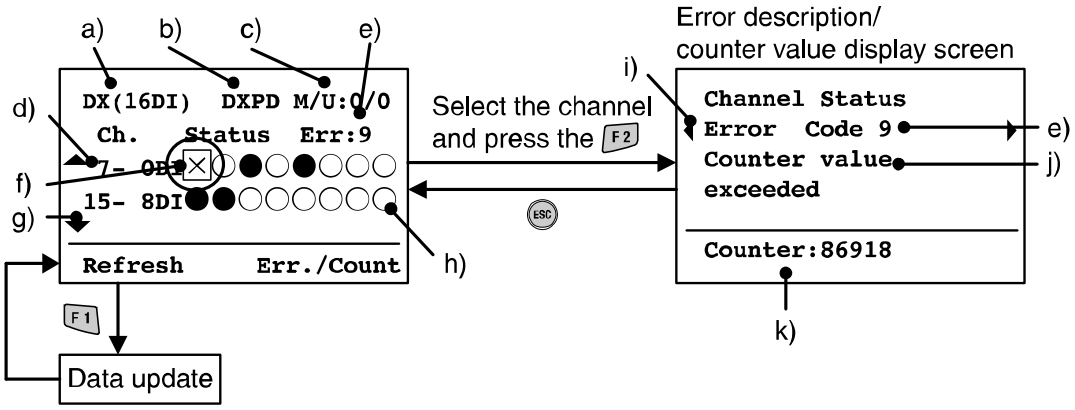
∗2: The unit positioned closest to the endplate is numbered as 0. An example is shown below.

•Example of unit number



2. Data monitor and channel selection

•For Digital unit



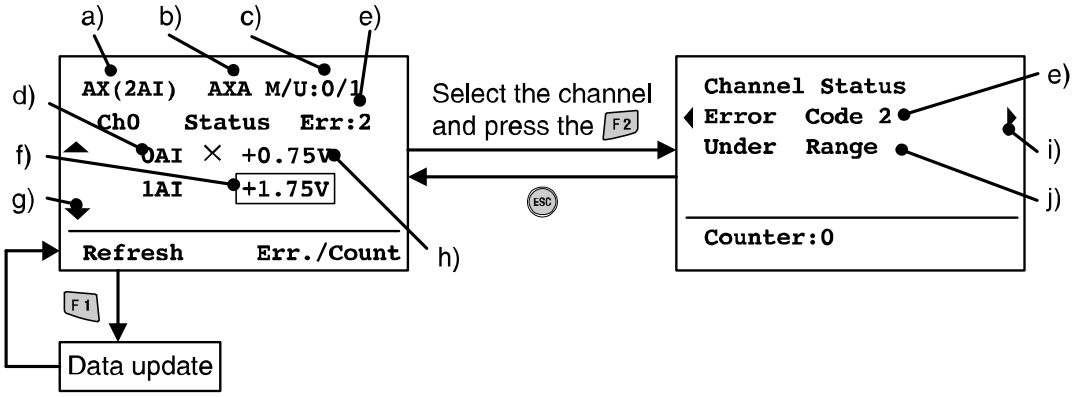
♦Explanation of screen

a) Displayed unit symbol (Refer to page 52)
b) Tag name (Refer to page 28)
c) Manifold number/Unit number (Refer to page 16)
d) Channel number
e) Error code (Refer to page 51)
f) Channel selection cursor
Select the channel with the ^, v, < and > buttons.
g) Other channels are displayed with the ^ and v buttons.
h) Display of channel status
○: OFF ●: ON ×: Error
i) The next error is displayed with the < and > buttons.
j) Error code details (Refer to page 51)
k) Counter value * (SI, DX, DY, DM only)
The count ON/OFF counter values are displayed.

∗: The update interval of the ON/OFF counter value depends on the unit. When the power source is turned on, counting starts from the counter value that was present at the time the power was switched OFF. The memory update interval of the units is as shown below.

•SI Unit
Updates from valve output 0 every 30 seconds.
•Digital unit (DX, DY, DM)
Updates for all channels every one hour.

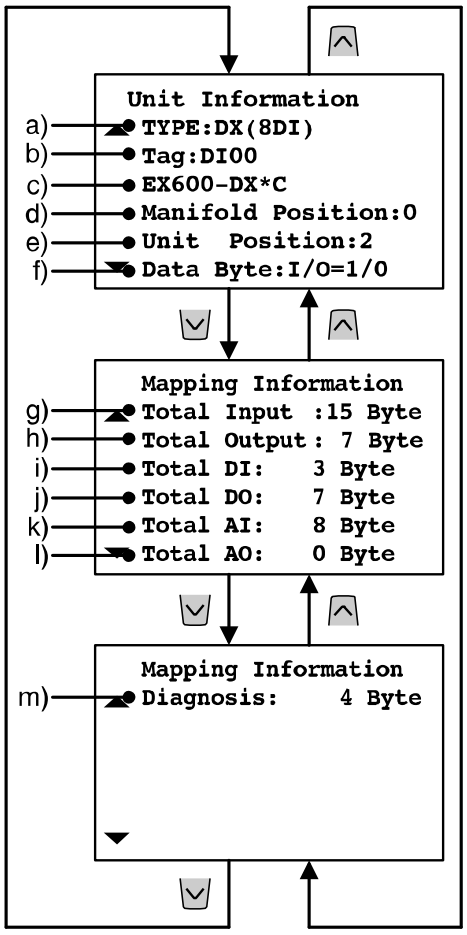
•For Analog unit



♦Explanation of screen

a) Displayed unit symbol (Refer to page 54)
b) Tag name (Refer to page 30)
c) Manifold number/Unit number (Refer to page 16)
d) Channel number
e) Error code (Refer to page 53)
f) Channel selection cursor
Select the channel with the ^ and v buttons.
g) Other channels are displayed with the ^ and v buttons.
h) Display of channel status
•When analog data format is set to other than Scaled.
±□□□mA: Input or output value (Current range)
±□□□V : Input or output value (Voltage range)
× : Error
•When analog data format is set to Scaled.
±□□•••□ : Input or output value
× : Error
The < or > button is pressed, the display changes as shown below.
±□□□mA: Input or output value (Current range)
±□□□V : Input or output value (Voltage range)
i) The next error is displayed with the < and > buttons.
j) Error code details (Refer to page 53)

3. Unit information display



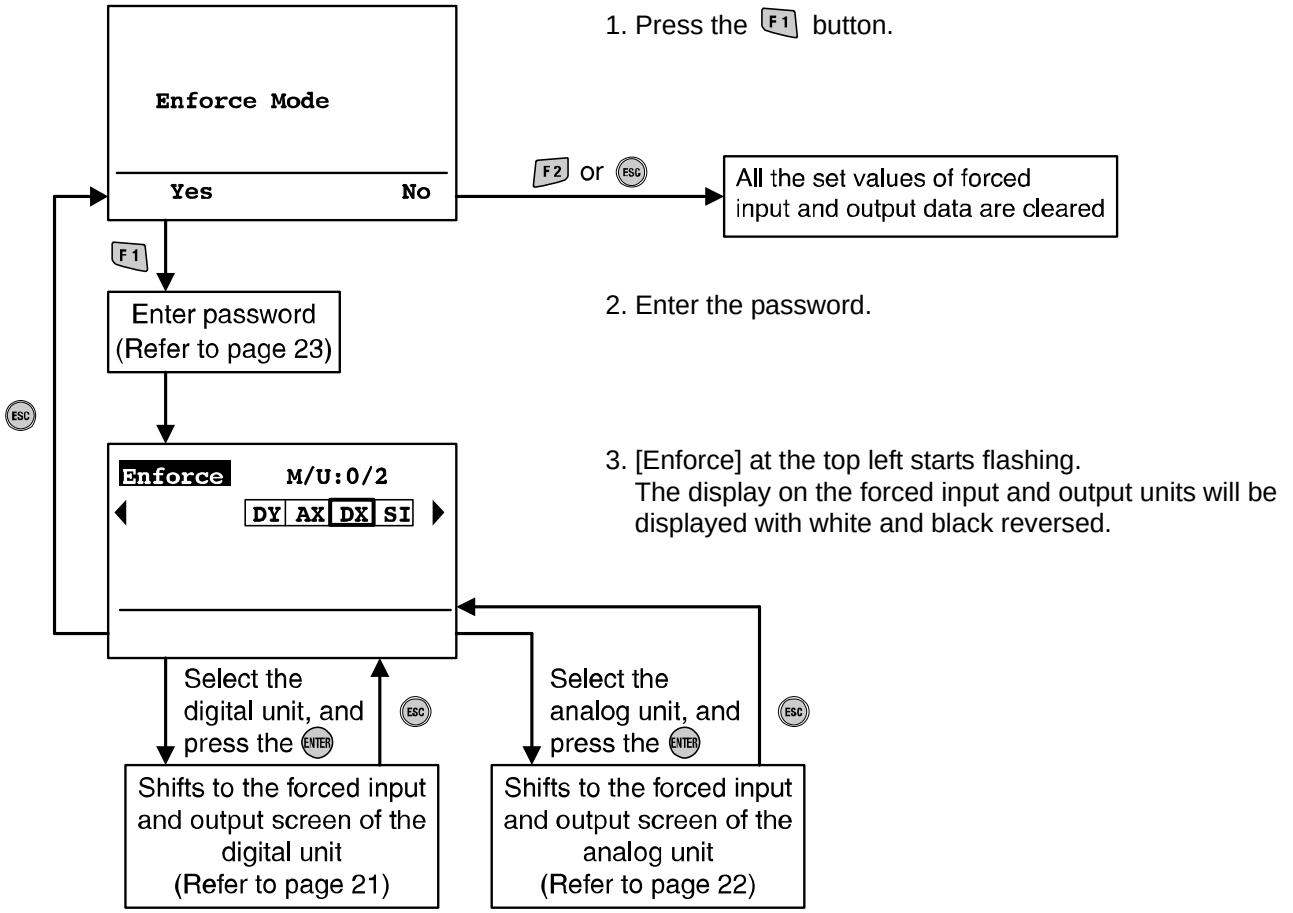
♦Explanation of screen
a) Displayed unit symbol (Refer to page 54)
b) Tag name (Refer to page 30)
c) Part number (Refer to page 54)
d) Manifold number (Refer to page 16)
e) Unit number (Refer to page 16)
f) Number of bytes that SI unit occupies (Input/Output)
g) Number of total input bytes
(Digital input + Analog input + Diagnostic data)
h) Number of total output bytes
(Digital output + Analog output)
i) Number of total digital input bytes
j) Number of total digital output bytes
k) Number of total analog input bytes
l) Number of total analog output bytes
m) Number of diagnostic information data bytes

4. Forced input and output

Digital and analog input and output data is forcibly changed. When forced input is sent, the forced input data is read regardless of the input signal sent from an input device. When forced output is sent, the forced output data is set regardless of the output data from PLC.

⚠ Warning

■The forced input/output function is used to change the signal status forcibly. When operating this function, be sure to check the safety of the surrounding and installation.
Otherwise, injury or equipment damage could result.

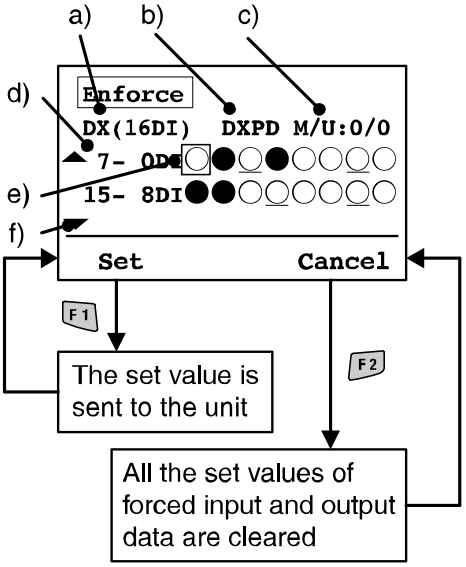


1. Press the F1 button.

2. Enter the password.

3. [Enforce] at the top left starts flashing.
The display on the forced input and output units will be displayed with white and black reversed.

•Forced input and output screen of the Digital unit



♦Explanation of screen
a) Displayed unit symbol (Refer to page 52)
b) Tag name (Refer to page 28)
c) Manifold number/Unit number (Refer to page 16)
d) Channel number
e) Channel selection cursor
f) Select the channel with the ^ and v buttons.

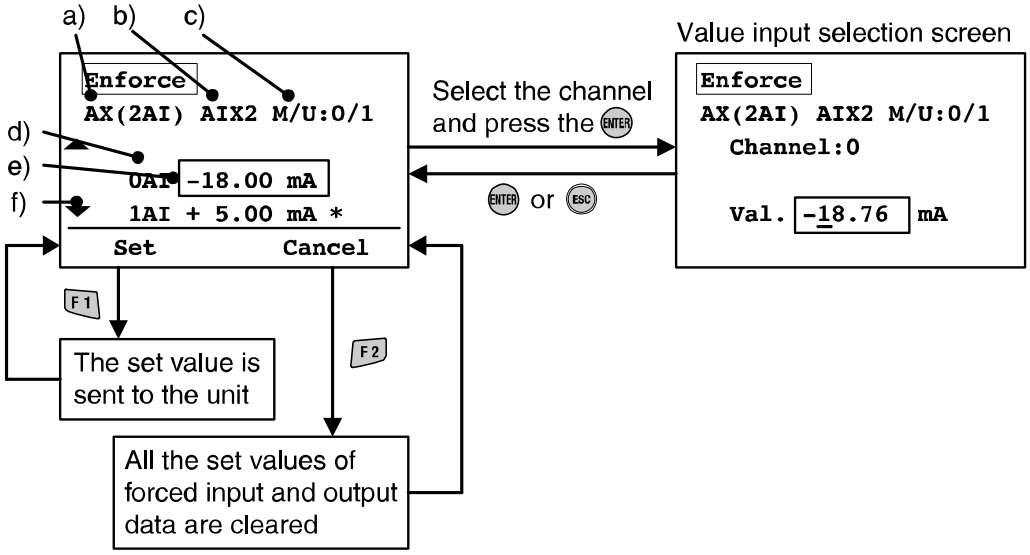
1. Select the channel with the ^, v, < and > buttons.
2. Every time the ENTER button is pressed, the display switches between the three states as shown below.

(Current value) (Forced ON) (Forced OFF)

→ ● or ○ → ● → ○ →

3. Select the F1 button [Set] or F2 button [Cancel].
   Set : Fix the data selected and send it to the unit.
   Cancel: Reset all the forced input and output to the current value.

•Forced input and output screen of the Analog unit

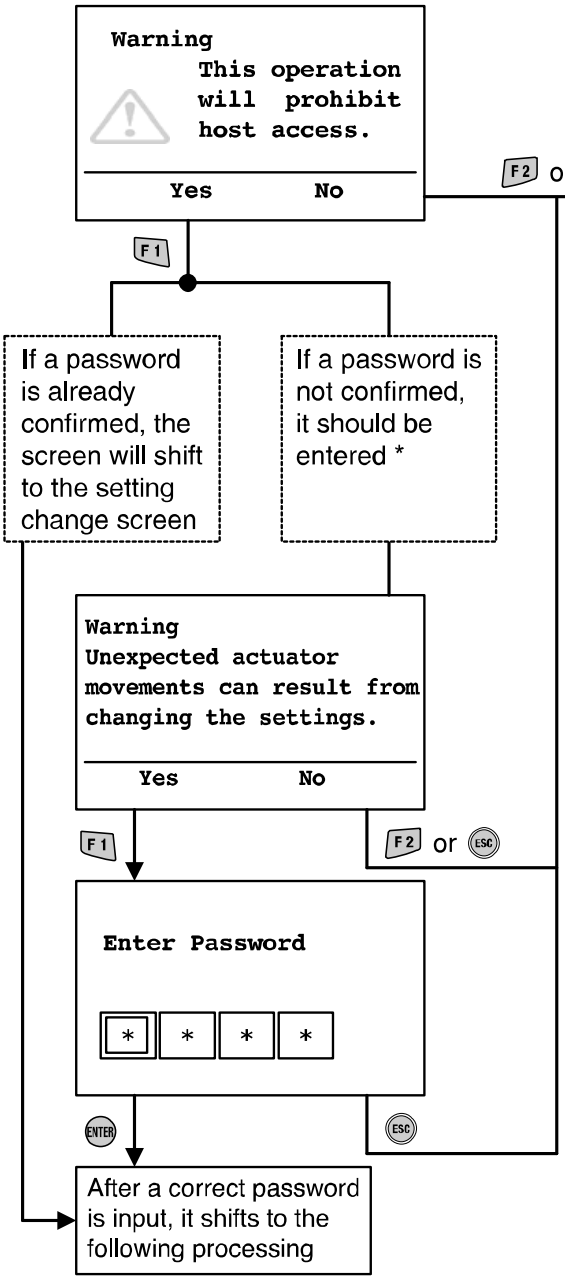


♦Explanation of screen
a) Displayed unit symbol (Refer to page 52)
b) Tag name (Refer to page 28)
c) Manifold number/Unit number (Refer to page 16)
d) Channel number
e) Channel selection cursor
f) Select the channel with the ^ and v buttons.
g) Display mode switch symbol

1. Select the channel with the ^ and v buttons and ENTER button pressed, the screen shifts to the value input selection screen.
2. An underline is displayed under the digits to be input.
   The underline is shifted to the digits to be set with the < and > buttons.
   Values and ± are changed with the ^ and v buttons.
3. Press the ENTER button to fix the value and return the screen to the previous page.
4. Select the F1 button [Set] or F2 button [Cancel].
   Set : Fix the data selected and send it to the unit.
   Cancel: Reset all the forced input and output data to the current value.

Input of password

When settings are changed in each mode, the password needs to be entered for confirmation.
(The default setting is "0000".)



1. Press the F1 button.

2. Press the F1 button.

3. Enter the password.
   Select the digit to be entered with the < and > buttons.
   Select the characters with the ^ and v button.
   Every time the ^ button is pressed, the value will change from A to Z and 0 to 9. When the v button is pressed, the value changes in the opposite direction.

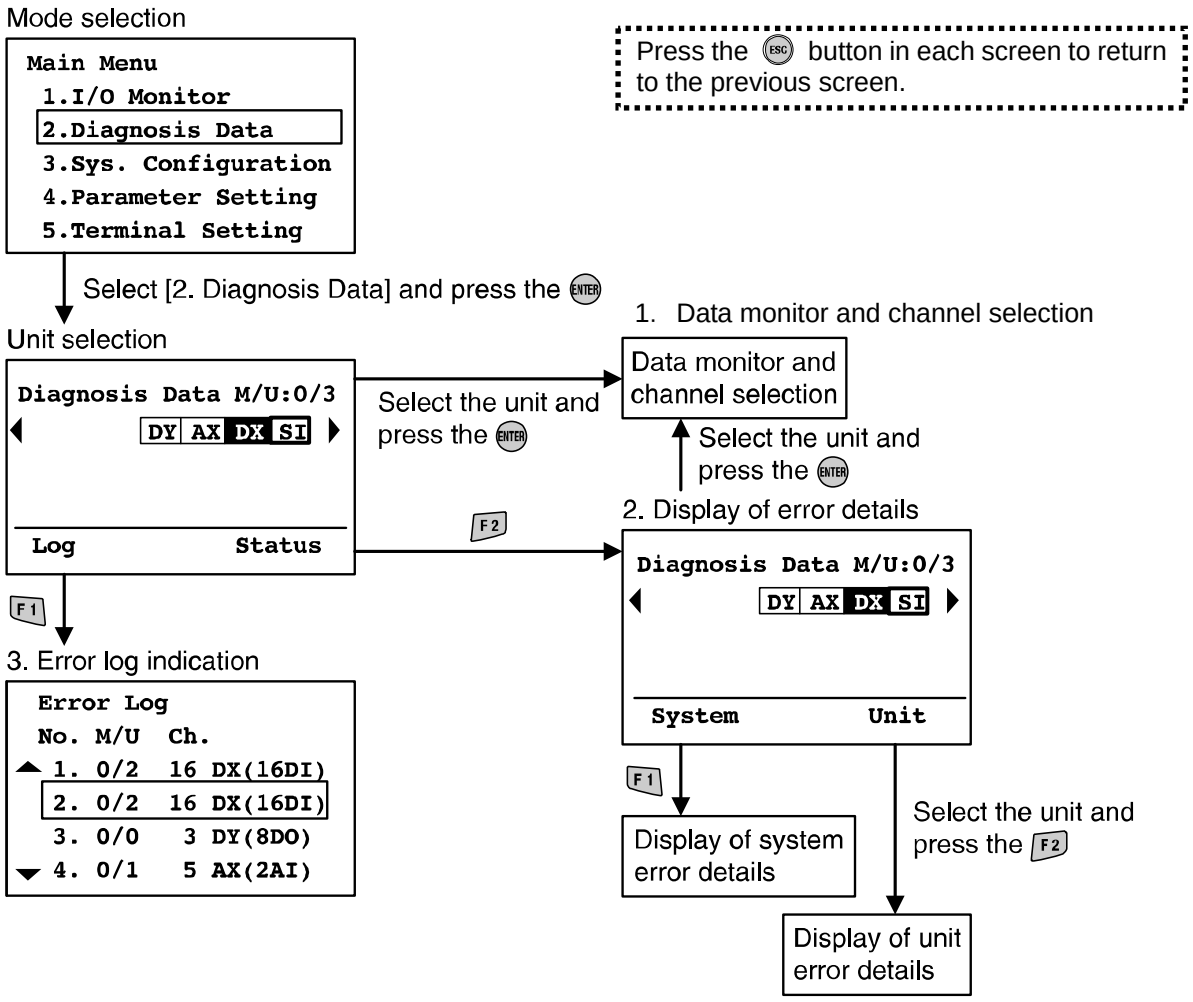
   *: If the password does not match, "wrong password" is displayed on the input screen. In that case, enter the correct password again.

*: When changing the settings after the unit has recovered from the POWER SAVE mode, it is necessary to enter the password again.

■2. Diagnosis Data

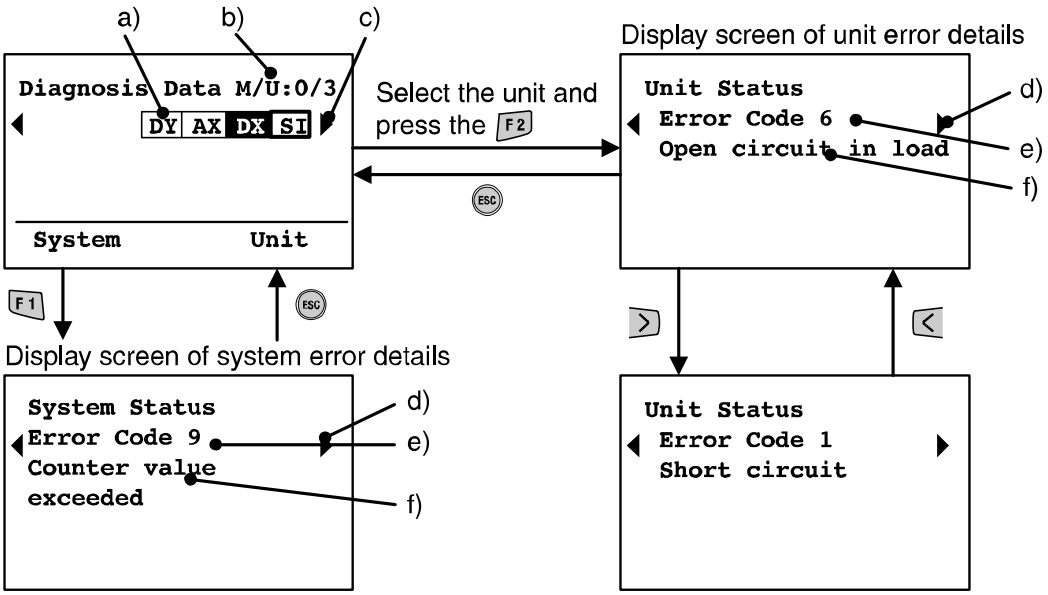
Mode levels

The diagnostic data check mode is composed as shown in the figure below.



Mode	Outline
1. Channel status display	Input and output status of channels and error information are displayed. (Refer to page 17, 18)
2. Display of error details	Diagnostic error information is displayed per system and unit in detail. (Refer to page 25)
3. Error log indication	The latest error log of the EX600 system is displayed in the order errors were generated (30 errors max.). (Refer to page 26)

2. Display of error details



♦Explanation of screen

a) Unit symbol (Refer to page 52)

b) Manifold number/Unit number (Refer to page 16)

c) The unit structure is displayed with the < and > buttons.

d) The next error is displayed with the < and > buttons.

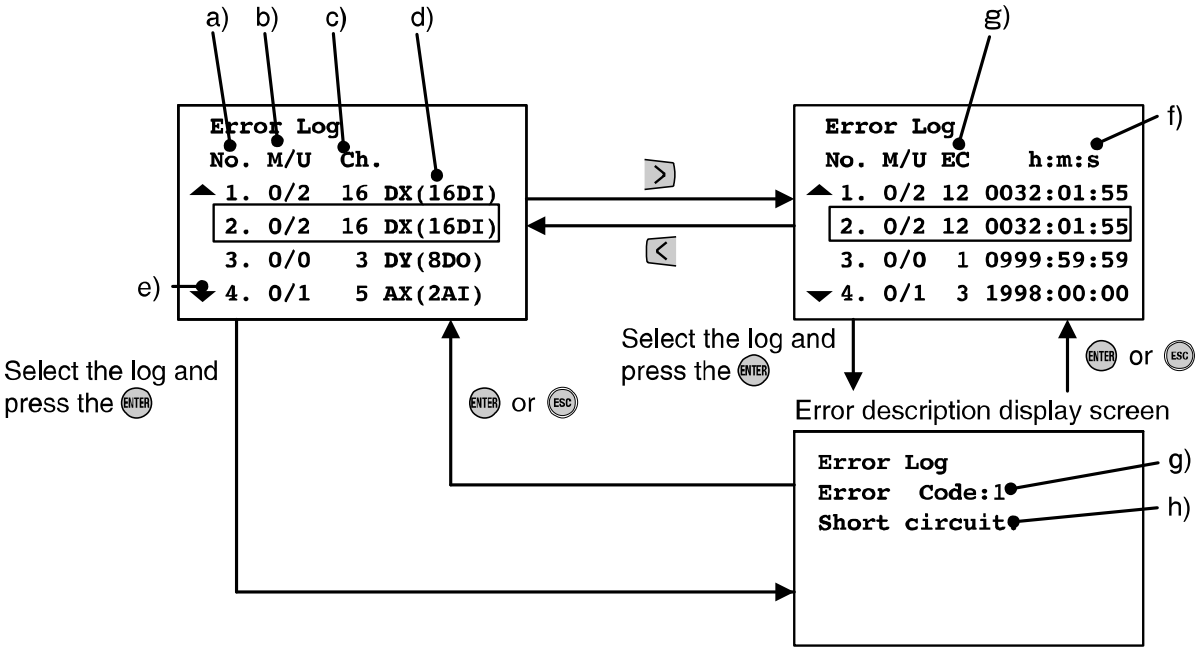
e) Error code (Refer to page 51)

f) Error code details (Refer to page 51)

∗: When the unit is selected and the ENTER button is pressed, the screen shift to the channel status display screen. (Refer to page 24)

3. Error log indication

The errors that have been generated are displayed in order from the top.



♦Explanation of screen

a) Error log number

b) Manifold number/Unit number (Refer to page 16)

c) Channel number

d) Displayed unit symbol (Refer to page 52)

e) The next error log is displayed with the ▲ and ▼ buttons.

f) h: hour, m: minute, s: second

The time elapsed from when the power supply was applied until the time when error was generated is displayed.

When the power supply of the SI unit is turned off, the time is reset.

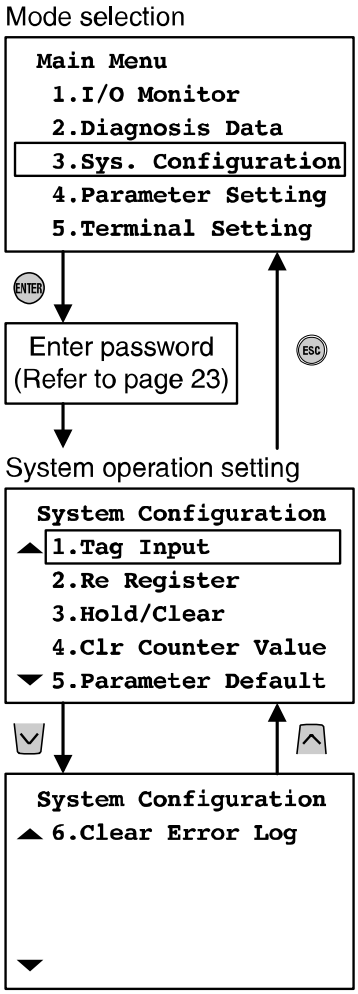
g) Error code (Refer to page 51)

h) Error code details (Refer to page 51)

■3. Sys. Configuration

Mode levels

The system operation setting mode is composed as shown in the figure below.



1. Select [3. Sys. Configuration] and press the ENTER button.

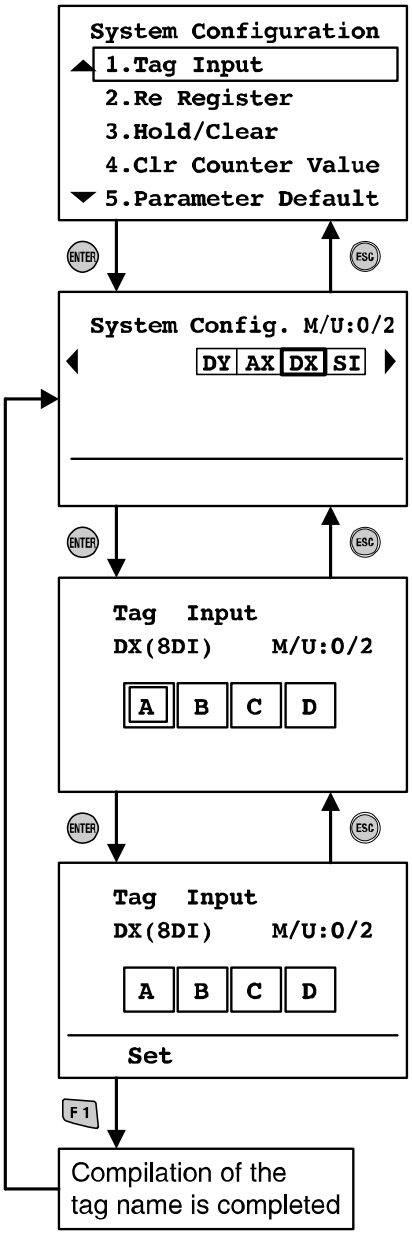
2. Enter the password.

3. Select items with the ∧ and ∨ buttons and press the ENTER button.

Mode	Outline
1. Tag Input	The tag name of the unit is compiled. (Refer to page 28)
2. Re Register	The structure memory information of the unit is updated. (Refer to page 29)
3. Hold/Clear	This mode is used to select whether the Hold/Clear function is set by the switch on the SI unit or by the Handheld Terminal. (Refer to page 30)
4. Clr Counter Value	The ON/OFF counter value of each unit is cleared. (Refer to page 31)
5. Parameter Default	Parameters of each unit are reset to the default values. (Refer to page 32)
6. Clear Error Log	All error logs are cleared. (Refer to page 32)

1. Tag Input

It is possible to set an arbitrary name for each unit.



1. Select [1. Tag Input] and press the ENTER button.

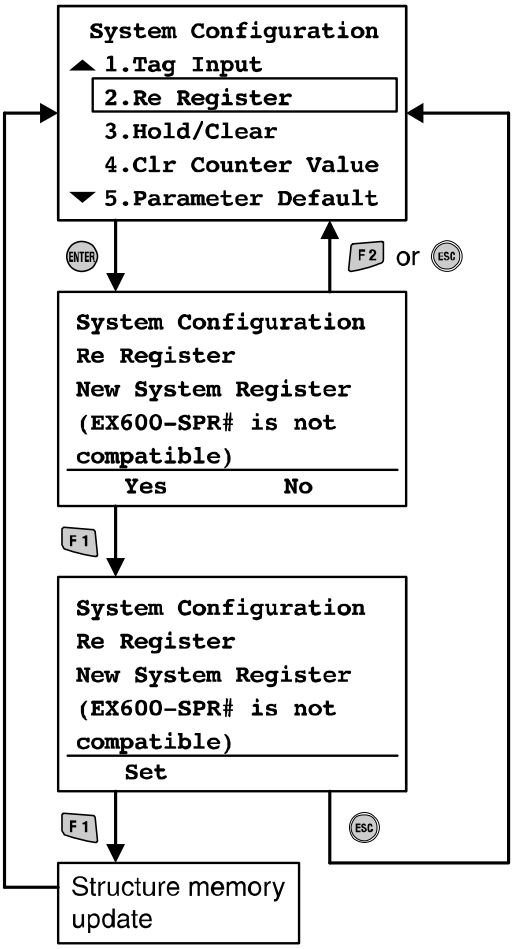
2. Select the unit with the < and > buttons and press the ENTER button.

3. Edit the tag name.
   Refer to [Password input] (page 23) for how to edit the tag name.

4. Press the F1 button.
   The compilation of the tag name is completed.

2. Re Register

It is possible to compare the unit structure stored in the memory with the current unit structure in EX600.
If the structure is different, a diagnostic error will be generated.



1. Select [2. Re Register] and press the ENTER button.

2. Press the F1 button.

3. Press the F1 button.
   The update of the structure memory is completed.

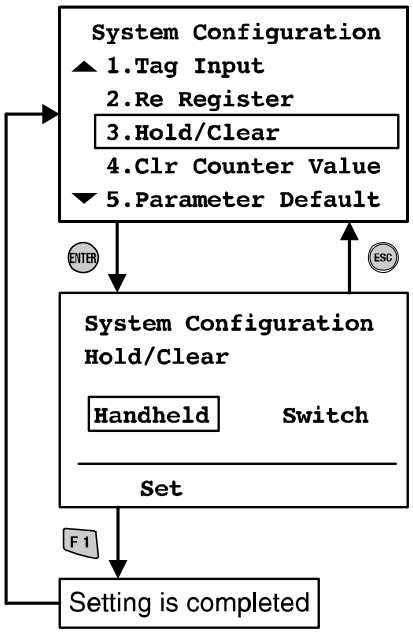
∗1: PROFIBUS DP compatible SI unit is not applicable to memory structure.

3. Hold/Clear

This mode changes whether Hold/Clear function is set by the switch on the SI unit or by the Handheld Terminal.

⚠ Caution

■Changing select Hold/Clear function mode switches the operation of I/O signals in an emergency. Carry out settings paying attention to safety.
Otherwise, injury or equipment damage could result.

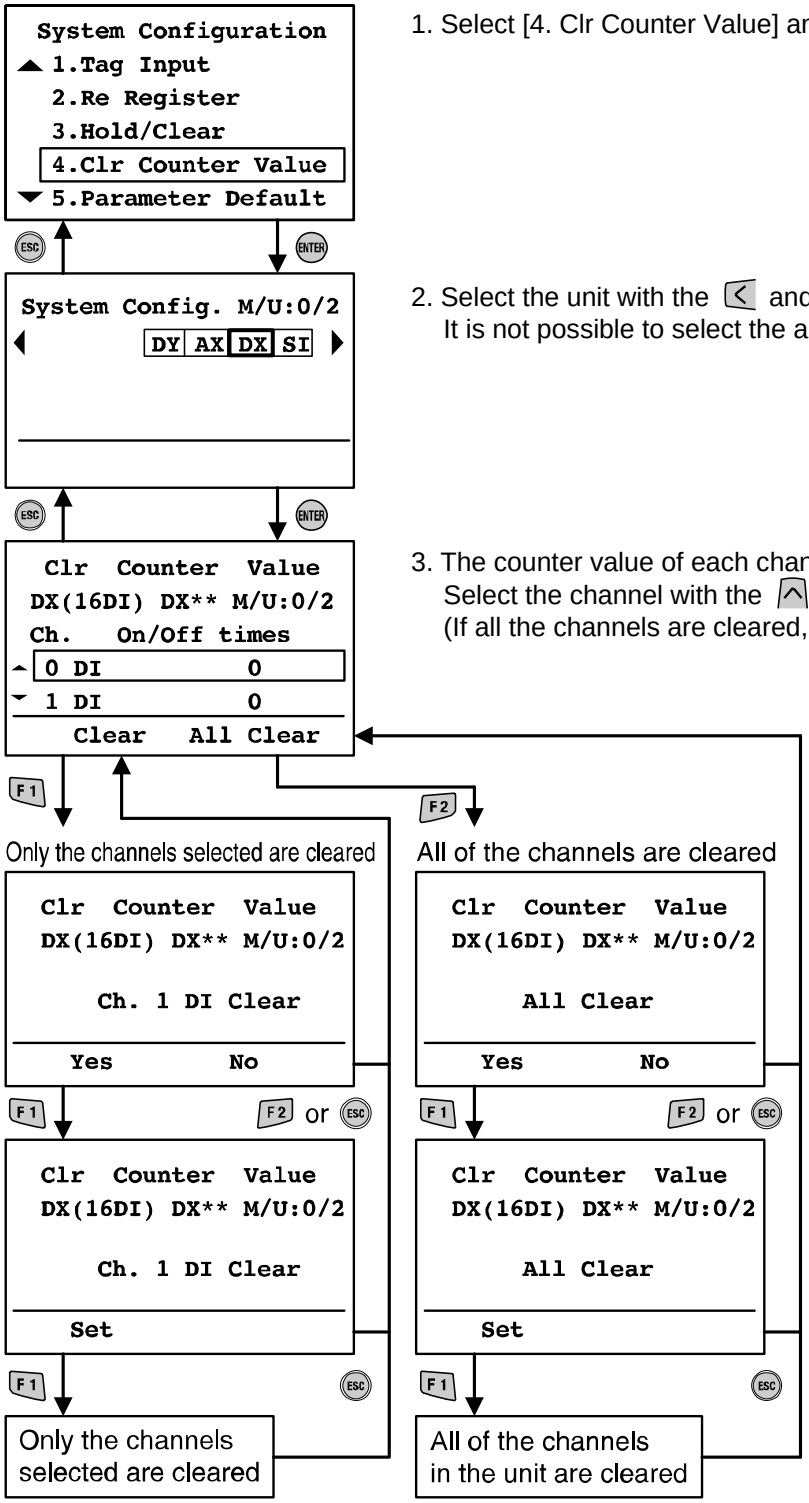


1. Select [3. Hold/Clear] and press the ENTER button.

2. Press the < or > buttons to select [Handheld] or [Switch].
   Handheld: Hold/Clear function is carried out using the Handheld Terminal setting.
   Switch: Hold/Clear function is carried out using the switch setting of the SI unit.

3. Press the F1 button.
   This selects the mode, and returns to the system operating setting screen.

4. Clr Counter Value



1. Select [4. Clr Counter Value] and press the ENTER button.

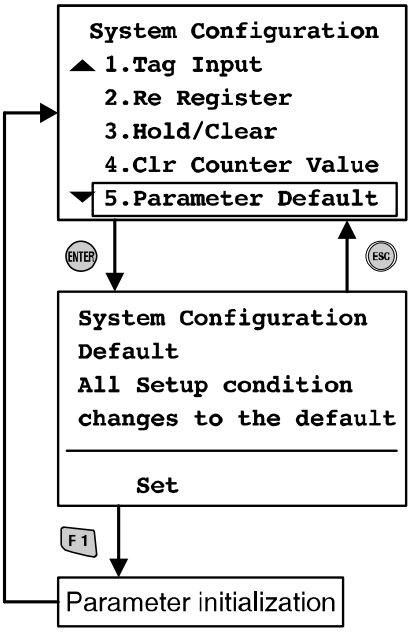
2. Select the unit with the < and > buttons and press the ENTER button.
   It is not possible to select the analog unit.

3. The counter value of each channel of the unit selected is displayed.
   Select the channel with the ^ and v buttons.
   (If all the channels are cleared, this operation is not necessary.)

4. Press the F1 button.

5. Press the F1 button.
   The counter values of the channel selected or all of the channels are cleared.

5. Parameter Default



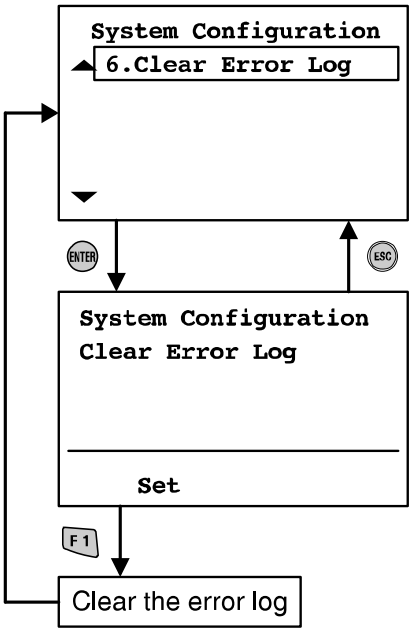
1. Select [5. Parameter Default] and press the ENTER button.

2. Press the F1 button.
   Return all the parameter settings to the default values, and return to the system operation setting screen.

⚠Warning

■Incorrect setting of parameters can cause malfunction. Be sure to check the settings before use.
Otherwise, injury or equipment damage could result.

6. Clear Error Log



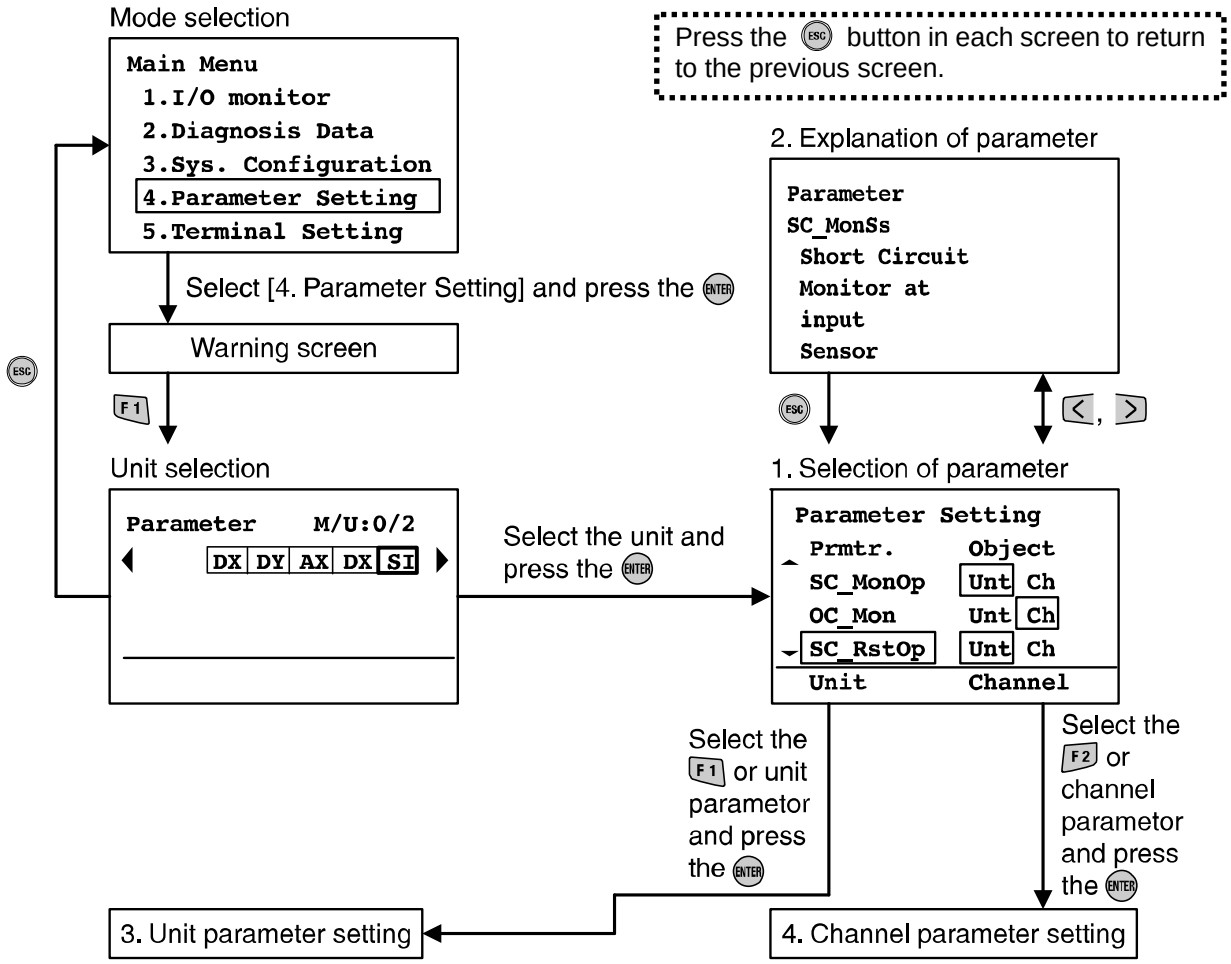
1. Select [6. Clear Error Log] and press the ENTER button.

2. Press the F1 button.
   Clears all the error logs, and returns to the system operation setting screen.

■4. Parameter Setting

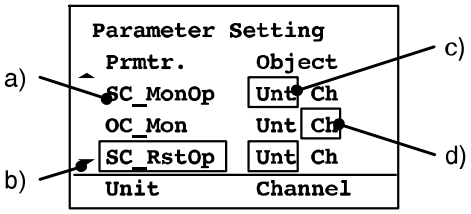
Mode levels

The parameter setting mode is composed as shown in the figure below.



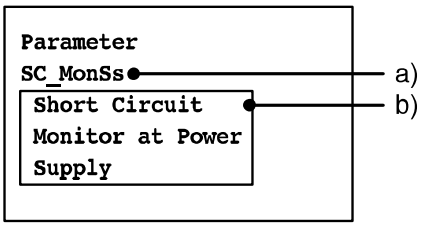
Mode	Outline
1. Selection of parameter	All the parameters of the unit selected are displayed. (Refer to page 34)
2. Explanation of parameter	Parameter details are explained. (Refer to page 34)
3. Unit parameter setting	Parameters of each unit are set. (Refer to page 35)
4. Channel parameter setting	Parameters of each channel are set. (Refer to page 41)

1. Selection of parameter



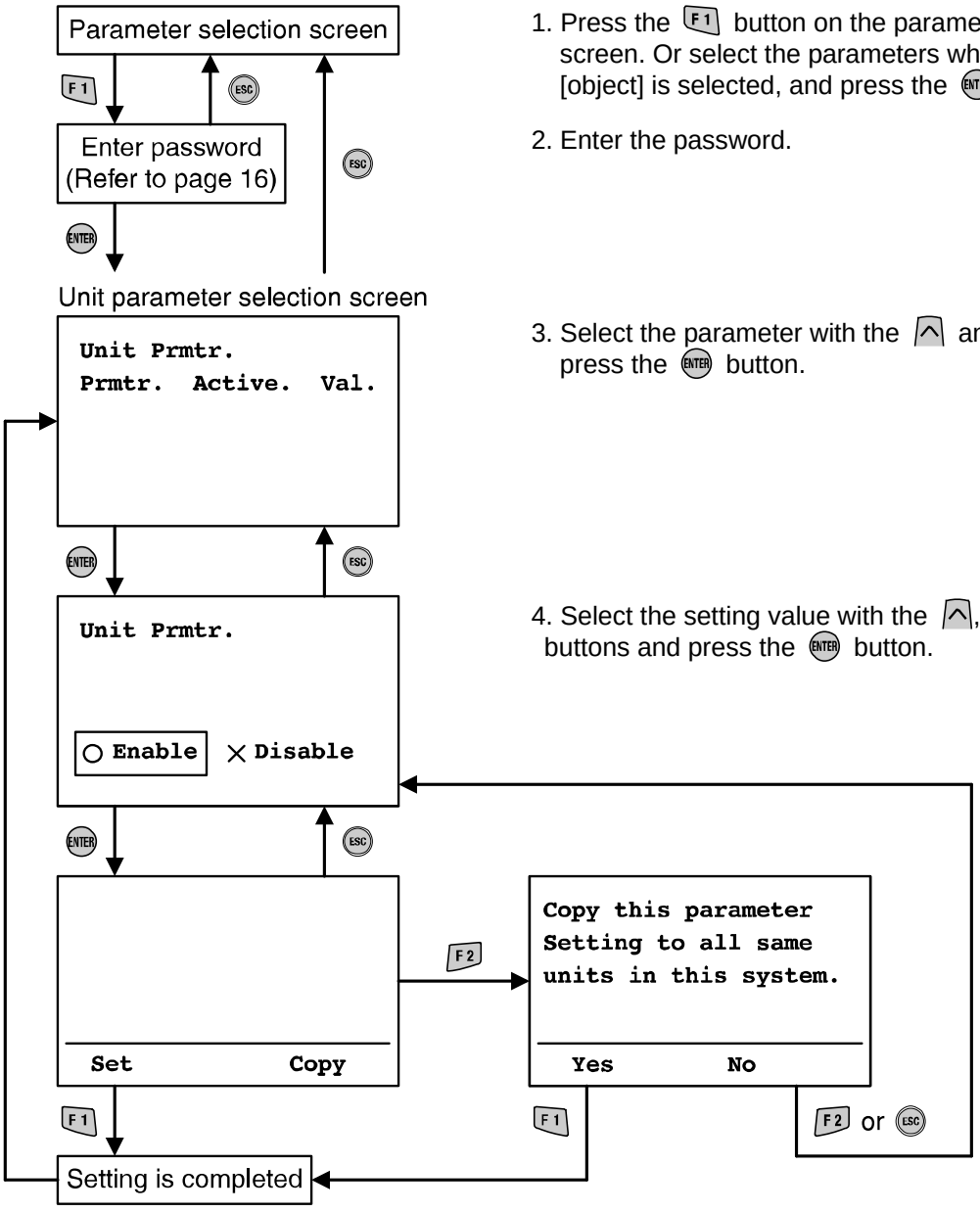
♦Explanation of screen
a) Name of each parameter to be set
b) The next parameter is displayed with the ^ and v buttons.
c) Parameters that can be set in each unit only.
d) Parameters that can be set in each channel only.

2. Explanation of parameter



♦Explanation of screen
a) Name of each parameter to be set
b) Parameter details

3. Unit parameter setting



1. Press the F1 button on the parameter selection screen. Or select the parameters where the [unit] in the [object] is selected, and press the ENTER button.

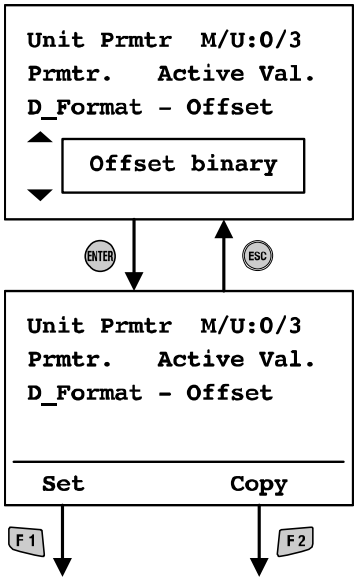
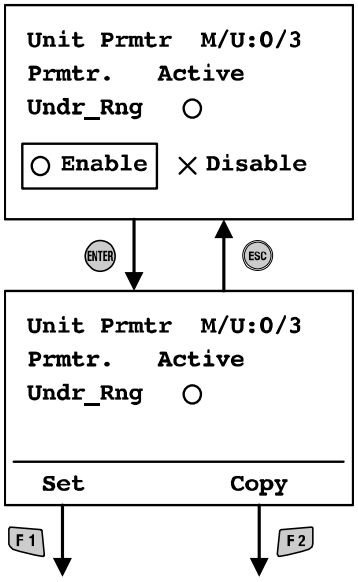
2. Enter the password.

3. Select the parameter with the ^ and v buttons and press the ENTER button.

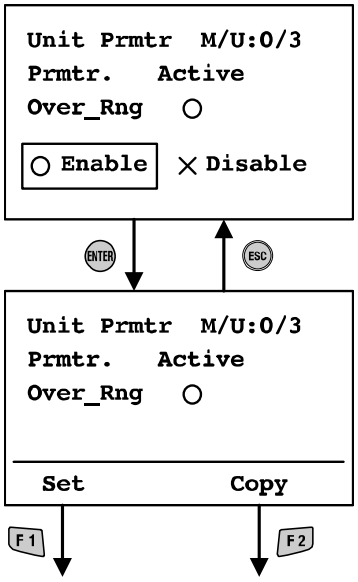
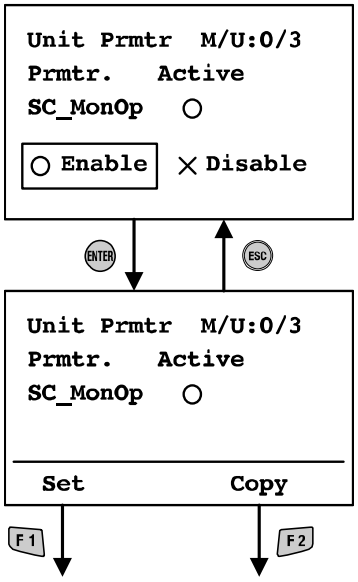
4. Select the setting value with the ^, v, < and > buttons and press the ENTER button.

5. Press the F1 button to complete the setting.
   To copy the set value to units of the same type in the manifold, press the F2 button.

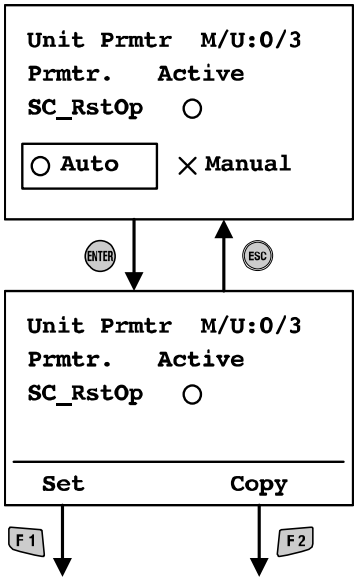
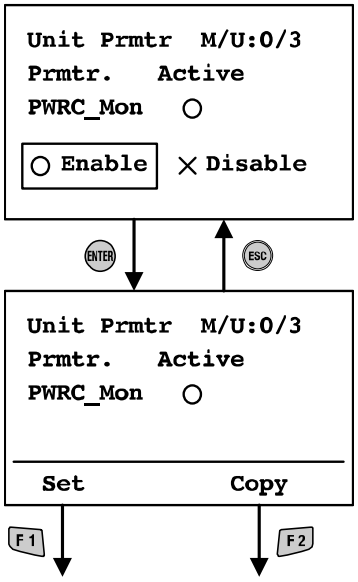
6. Press the F1 button.
   Copy is completed, and the screen returns to the unit parameter selection screen.

No.	Parameter (Symbol)	Unit parameter selection screen
1	Analog data format (D_Format)	 Select with the ∧ and ∨ buttons.
2	Under range detection (Undr_Rng)	 Select with the < and > buttons.

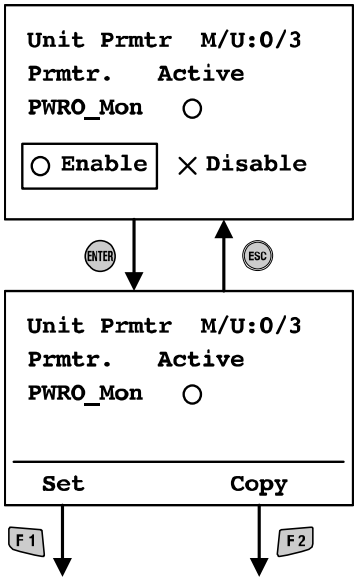
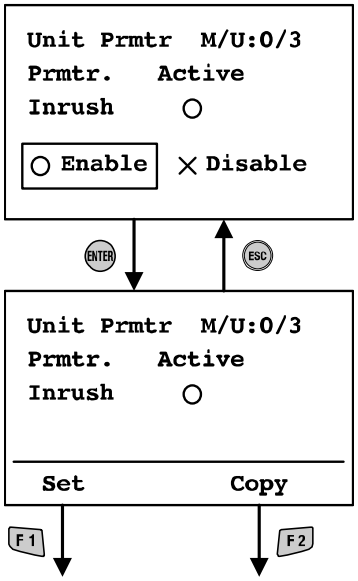
∗: Information on the parameters can be found in the manual for the SI unit.

No.	Parameter (Symbol)	Unit parameter selection screen
3	Over range detection (Over_Rng)	 Select with the < and > buttons.
4	The power supply short circuit detection for the input or output device (SC_MonOp) (SC_MonSs) Op: Output Ss: Sensor power supply	 Select with the < and > buttons.

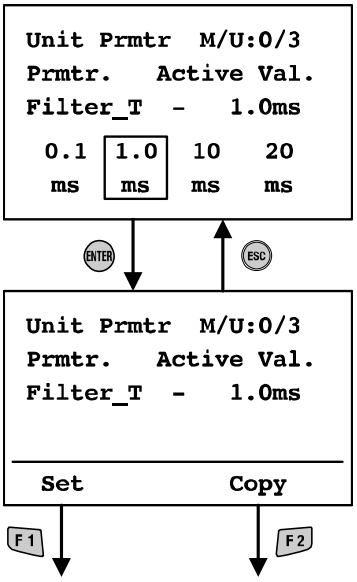
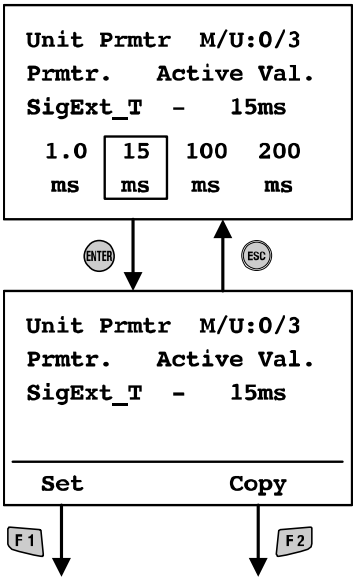
∗: Information on the parameters can be found in the manual for the SI unit.

No.	Parameter (Symbol)	Unit parameter selection screen
5	Restart after output load short circuit (SC_RstOp)	 Select with the < and > buttons.
6	Power supply for control and input voltage monitor (PWRC_Mon)	 Select with the < and > buttons.

∗: Information on the parameters can be found in the manual for the SI unit.

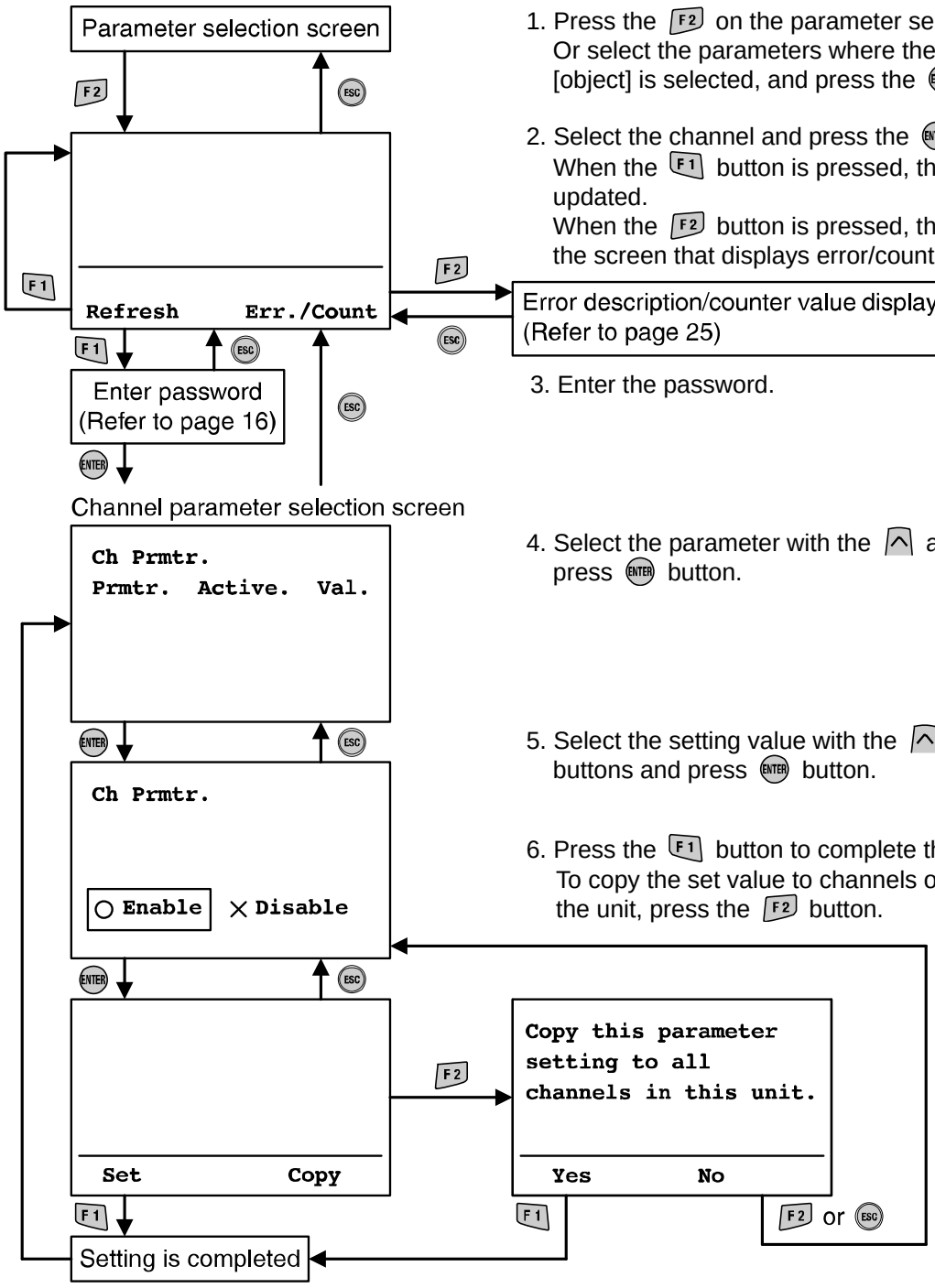
No.	Parameter (Symbol)	Unit parameter selection screen
7	Power supply for output voltage monitor (PWRO_Mon)	 Select with the < and > buttons.
8	Inrush current filter (Inrush)	 Select with the < and > buttons.

∗: Information on the parameters can be found in the manual for the SI unit.

No.	Parameter (Symbol)	Unit parameter selection screen
9	Input filtering time (Filter_T)	 Select with the < and > buttons.
10	Input extension time (SigExt_T)	 Select with the < and > buttons.

∗: Information on the parameters can be found in the manual for the SI unit.

4. Channel parameter setting



1. Press the F2 on the parameter selection screen.
   Or select the parameters where the [channel] in the [object] is selected, and press the ENTER button.

2. Select the channel and press the ENTER button.
   When the F1 button is pressed, the information is updated.
   When the F2 button is pressed, the screen shifts to the screen that displays error/counter values.

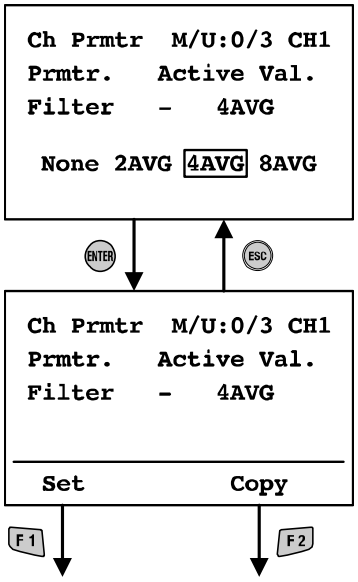
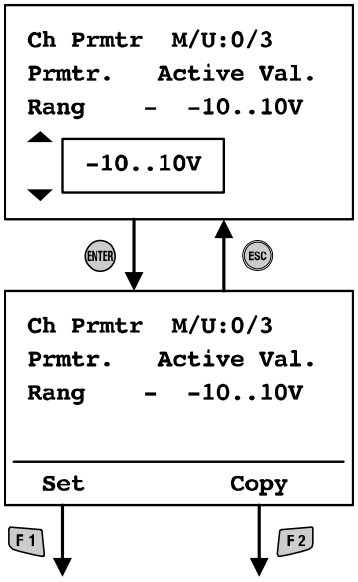
3. Enter the password.

4. Select the parameter with the ^ and v buttons and press ENTER button.

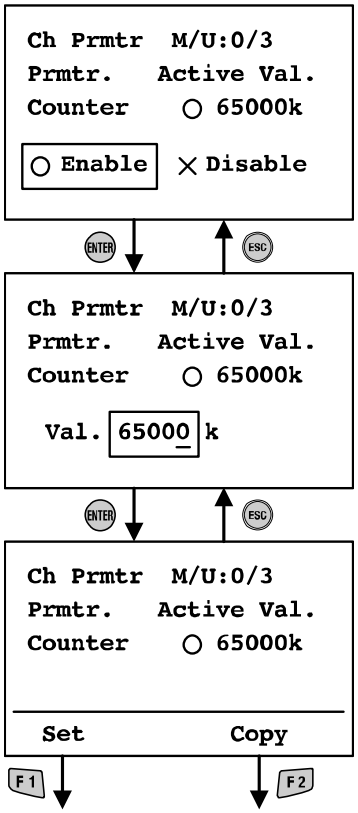
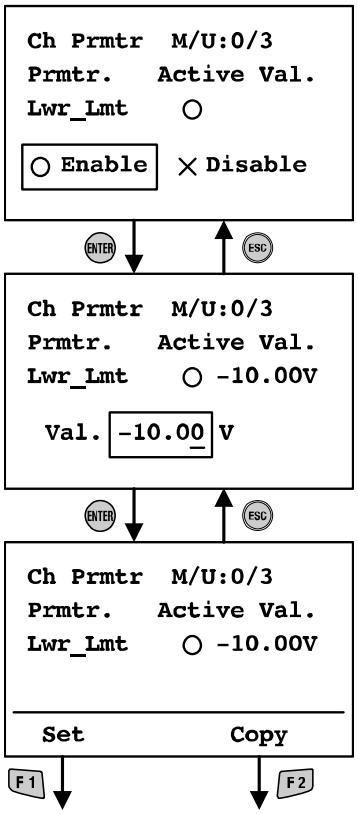
5. Select the setting value with the ^, v, <, and > buttons and press ENTER button.

6. Press the F1 button to complete the setting.
   To copy the set value to channels of the same type in the unit, press the F2 button.

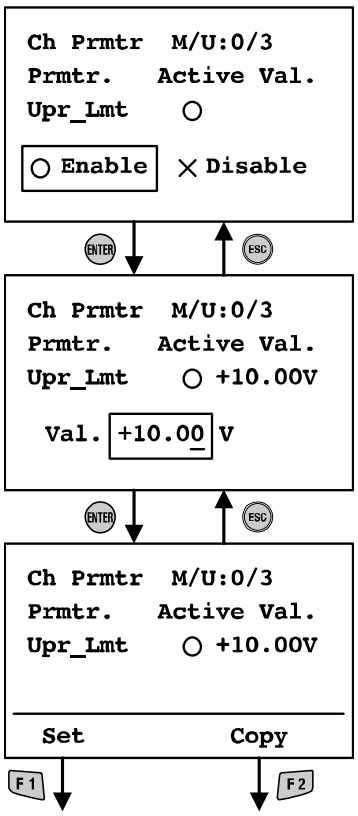
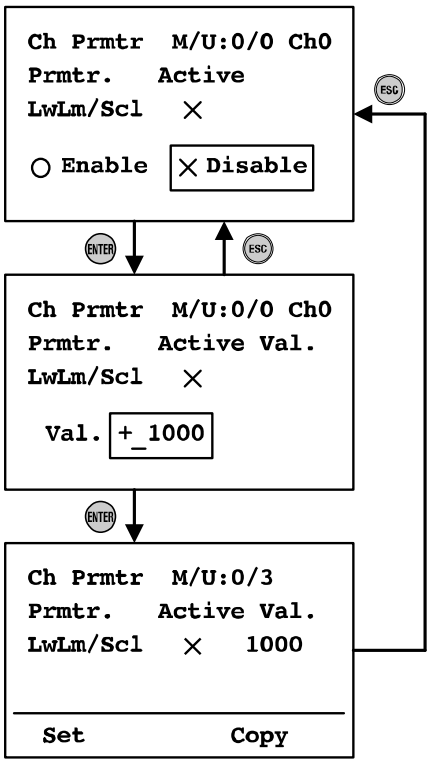
7. Press the F1 button.
   Copy is completed, and the screen returns to the channel parameter selection screen.

No.	Parameter (Symbol)	Channel parameter selection screen
1	Analog average filter (Filter)	 Select with the < and > buttons.
2	Analog range (Range)	 Select with the ^ and v buttons.

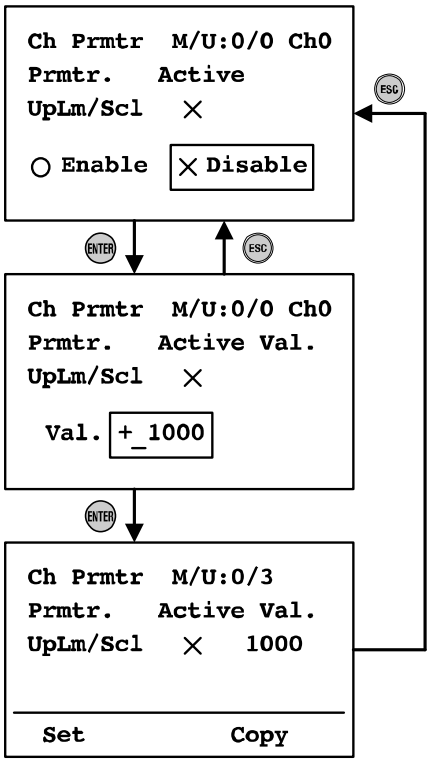
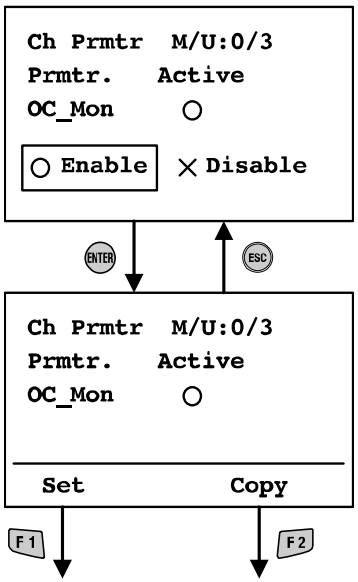
∗: Information on the parameters can be found in the manual for the SI unit.

No.	Parameter (Symbol)	Channel parameter selection screen
3	Output ON/OFF counter (Counter)	 Select with the < and > buttons. Move the digit to input with the < and > buttons. Changes the values with the ^ and v buttons.
4	User setting value lower limit error (Lwr_Lmt)	 Select with the < and > buttons. Move the digit to input with the < and > buttons. Changes the values with the ^ and v buttons.

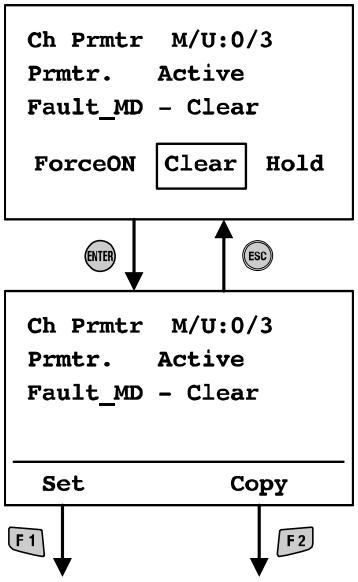
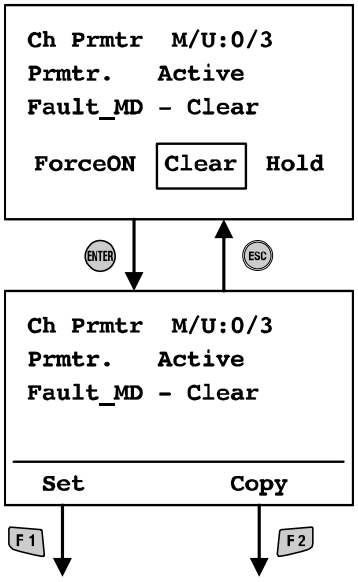
∗: Information on the parameters can be found in the manual for the SI unit.

No.	Parameter (Symbol)	Channel parameter selection screen
5	User setting value upper limit error (Upr_Lmt)	 Select with the ＜ and ＞ buttons. Move the digit to input with the ＜ and ＞ buttons. Changes the values with the ∧ and ∨ buttons.
6	Scale lower limit setting (LwLm/Scl)	 Select with the ＜ and ＞ buttons. Move the digit to input with the ＜ and ＞ buttons. Changes the values with the ∧ and ∨ buttons.

∗: Information on the parameters can be found in the manual for the SI unit.

No.	Parameter (Symbol)	Channel parameter selection screen
7	Scale upper limit setting (UpLm/Scl)	 Select with the ◁ and ▷ buttons. Move the digit to input with the ◁ and ▷ buttons. Changes the values with the △ and ▽ buttons.
8	Open circuit detection (OC_Mon)	 Select with the ◁ and ▷ buttons.

∗: Information on the parameters can be found in the manual for the SI unit.

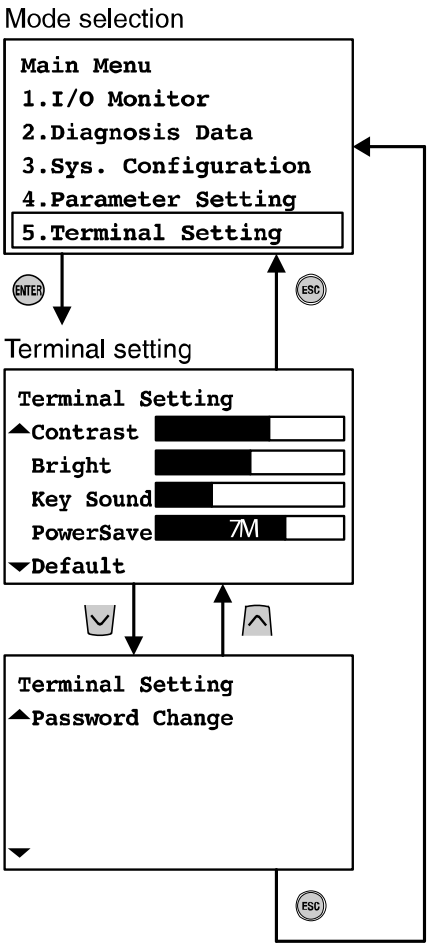
No.	Parameter (Symbol)	Channel parameter selection screen
9	Output setting during communication fault (Fault_MD) (Fault_MA) MD: Digital output MA: Analog output	 Select with the < and > buttons.
10	Output setting for communication idling (Idle_MD) (Idle_MA) MD: Digital output MA: Analog output	 Select with the < and > buttons.

∗: Information on the parameters can be found in the manual for the SI unit.

■5. Terminal Setting

Mode levels

The Terminal Setting mode is composed as shown in the diagram below.

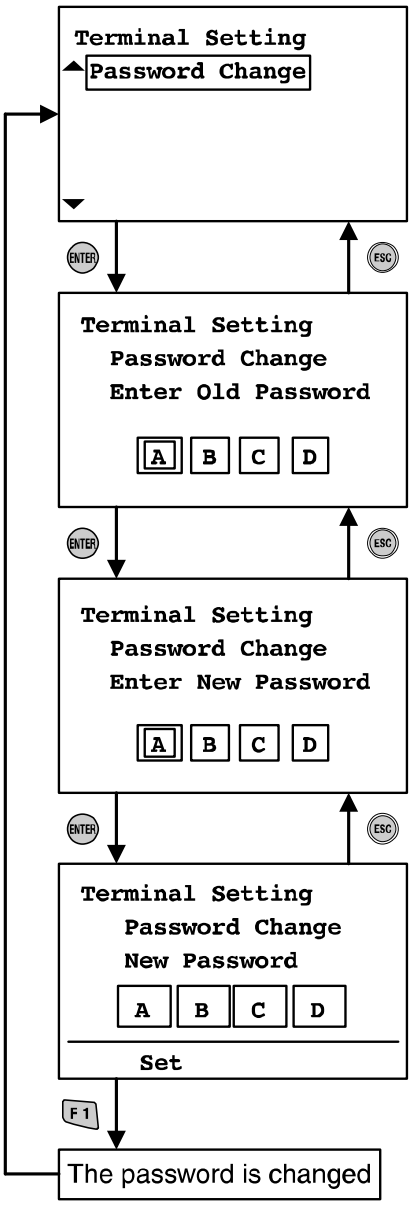


1. Select [5. Terminal Setting] and press the ENTER button.

2. Selects items with the ∧ and ∨ buttons.
3. Changes the setting with the < and > buttons.
4. When the ENTER button is pressed, the setting will become valid.
5. Press the ESC button to return to the mode selection screen.

Mode	Outline	Default setting
Contrast	The contrast the LCD display is set in 9 stages (0 to 8).	4
Bright	The brightness of the LCD display is set in 5 stages (0 to 4).	2
Key Sound	The button click sound volume is set in 5 stages (0 to 4).	2
PowerSave	The time until the unit goes into POWER SAVE mode when no button operation is performed is set 5 stages (OFF, 1 min., 3 min., 7 min. and 10 min.).	1M
Default	All of the settings above are returned to the default settings.	-
Password Change	Change the password. (Refer to page 48)	0000

Password Change



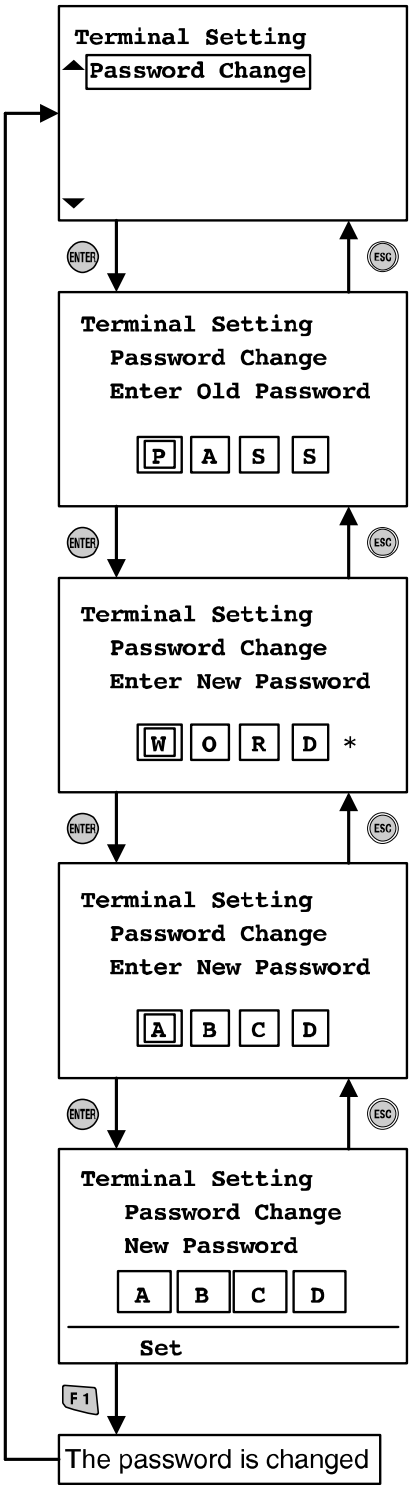
1. Select [Password Change] and press the ENTER button.

2. Input the current password.
   Select the digit to be set with the < and > buttons.
   Select the words with the ^ and v button.
   Every time the ^ button is pressed, the value changes from A to Z and 0 to 9.
   When the v button is pressed, the value changes in the opposite direction.
   *: If the password does not match, "wrong password" is displayed on the input screen. In that case, enter the correct password again.

3. Enter a new password.
   The method of entering the password is the same as above.

4. Press the F1 button.
   A new password is set, and the screen is returned to the terminal setting screen.

If you forget the password, enter "PASS" and then "WORD" in that order in the password change mode.
A new password can then be set.



1. Enter "PASS", and press the ENTER button.
   "*" is displayed on the lower right of the screen.

2. Enter "WORD", and press the ENTER button.

3. Enter a new password.
   (The setting method is the same as in password change mode.)

4. Press the F1 button.
   A new password is set, and the screen is returned to the terminal setting screen.

Troubleshooting

No.	Failure	Possible cause	Troubleshooting
1	POWER LED is OFF.	Power supply error.	•Check whether "PWR" LED of the SI unit lights up in green. •Refer to the operation manual of the unit, and supply a voltage of 24 VDC ±10% to the SI unit power supply for control and input.
		Connection failure of the cable for Handheld Terminal.	Check the cable for Handheld Terminal.
2	ERROR LED is ON.	EX600 diagnostic error.	Check the error in the diagnostic data check mode. Refer to the error code list and Operation Manual for the unit, and take the appropriate countermeasure for the error.
3	LCD display does not turn ON.	POWER SAVE mode.	Press the (ESC) button and check whether the LCD display turns ON.
		LCD failure.	Stop using the product. Contact your sales representative.
4	"Warning System access is not completed.••••" is displayed.	Connection failure of the cable for Handheld Terminal.	Check the cable for Handheld Terminal.
		EX600 units are not connected properly.	If the "ST(M)" LED of the SI unit is flashing in red and green alternately, check whether the units are connected properly.
5	The unit displays "?".	Configuration memory error.	Check that the layout of the manifold has not been changed. Refer to the error code list and Operation Manual for the unit, and take the appropriate countermeasure for the error.
		EX600 units are not connected properly.	If the "ST(M)" LED of the SI unit is flashing in red and green alternately, check whether the units are connected properly.
6	Other Errors.	Failure of Handheld Terminal.	Stop using the product. Contact your sales representative.

•Error code list

Error code	Content
0	-
1	Short circuit has occurred.
2	Analog input value has exceeded the lower limit of the range.
3	Analog input value has exceeded the upper limit of the range.
4	-
5	-
6	Broken wire is detected.
7	Analog value (value set by user) has exceeded the upper limit.
8	Analog value (value set by user) has exceeded the lower limit.
9	ON/OFF count has exceeded the set value.
10 to 15	-
16	Power supply voltage level for control and inputs is abnormal.
17	Power supply voltage level for output is abnormal.
18	-
19	Connection error between the units. (When operating)
20	Connection error between the units. (When power is supplied)
21	Configuration memory error.
22	System error.
23	Internal component has failed.

Parameter Setting

Refer to the SI unit Operation Manual of protocol used.

•Unit type

Unit symbol and displayed unit symbol of each unit are displayed.

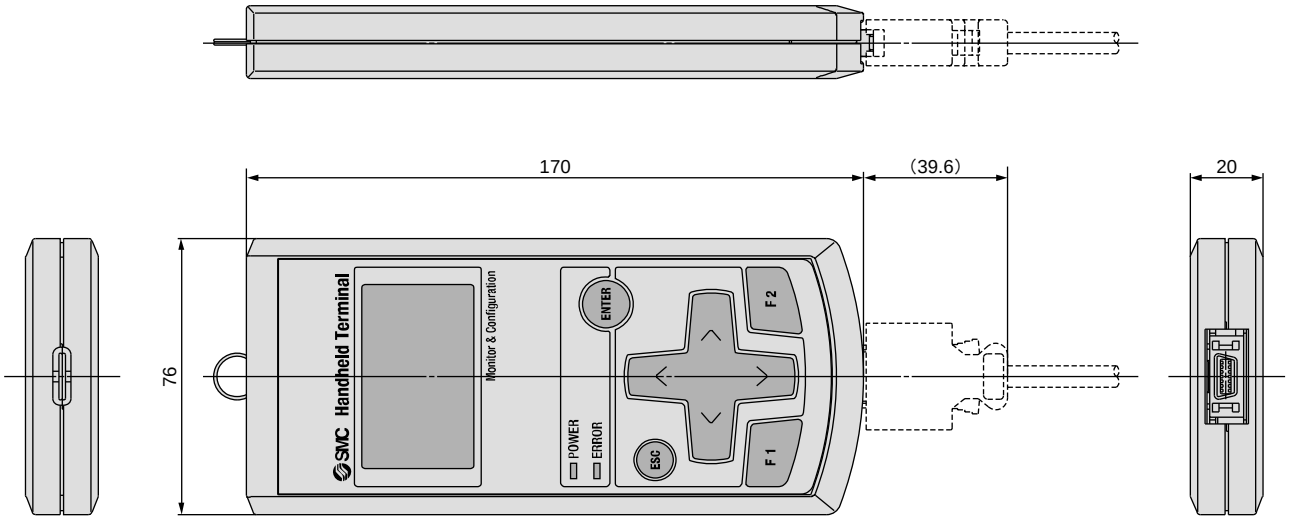
Unit type	Unit symbol	Displayed unit symbol	Part number
Digital input	DX	DX (8DI)	EX600-DX□B EX600-DX□C EX600-DX□C1
		DX (16DI)	EX600-DX□D EX600-DX□E EX600-DX□F
Digital output	DY	DY (8DO)	EX600-DY□B
		DY (16DO)	EX600-DY□E EX600-DY□F
		DY (24DO)	EX600-DY□E1
Digital I/O	DM	DM (8DI8DO)	EX600-DM□E EX600-DM□F
Analog input	AX	AX (2AI)	EX600-AXA
Analog output	AY	AY (2AO)	EX600-AYA
Analog I/O	AM	AM (2AI2AO)	EX600-AMB
SI unit (Occupies 8 outputs)	SI	SI (8SOL)	EX600-SDN□, EX600-SDN□A EX600-SPR□, EX600-SPR□A EX600-SMJ□ EX600-SEN□
SI unit (Occupies 16 outputs)		SI (16SOL)	EX600-SDN□(A) EX600-SPR□(A) EX600-SMJ□ EX600-SEN□
SI unit (Occupies 24 outputs)		SI (24SOL)	EX600-SDN□(A) EX600-SPR□(A) EX600-SMJ□ EX600-SEN□
SI unit (Occupies 32 outputs)		SI (32SOL)	EX600-SDN□(A) EX600-SPR□(A) EX600-SMJ□ EX600-SEN□

Specification

■Specifications

Model		EX600-HT1
Communication type		RS232C
Communication speed		9600 bps
Power supply		24 VDC is supplied from the SI unit
Current consumption		50 mA or more
Display		LCD with back light
Resolution		128x64 dot
Connector (Handheld Terminal)		14 pin connector
Connector (SI unit)		M12 connector
Environment	Enclosure	IP20
	Operating temperature range	-10 to 50 °C
	Storage temperature range	-20 to 60 °C
	Operating humidity range	35 to 85%RH (No condensation)
	Vibration resistance	10 to 57 Hz: constant amplitude 0.75 mm p-p 57 to 150 Hz: constant acceleration 49 m/s2 For 2 hours each in directions of X, Y and Z respectively (De-energized)
	Impact resistance	300 m/s2 3 times each in directions of X, Y and Z respectively (De-energized)
Standard		CE marking, RoHS
Weight		160 g

■Dimensions



Revision history
A: Add the contents of function. B: Limited warranty and Disclaimer are added.

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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